I

# AN ANALYSIS OF
# FINANCING THE
# MARYLAND STATE RETIREMENT SYSTEMS

JULY 1983

MILLIMAN & ROBERTSON, INC.
CONSULTING ACTUARIES

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July 8, 1983

Board of Trustees for
Maryland State Retirement
and Pension Systems
301 West Preston Street
Baltimore, Maryland 21201

Dear Members of the Board:

We are pleased to submit herewith our report of "An Analysis of Financing the Maryland State Retirement Systems" as requested by the Board.

The most recent actuarial valuation of the systems as of June 30, 1982 indicated that the systems are in sound actuarial condition but that the pattern of budget cost projections is not sufficiently predictable. The changes recommended in this report should result in a much more stable and predictable funding pattern.

Part I of the report is an executive summary which briefly describes our recommendations and the overall cost impact of the suggested changes.

Part II presents more detailed information concerning specific problem areas and recommended solutions.

Finally, in the appendices, we include supporting information, graphical material to illustrate the effect of the proposed changes and ten-year cost projections.

Respectfully submitted,

MILLIMAN & ROBERTSON, INC.

Eugene M. Kalwarski

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# PART I

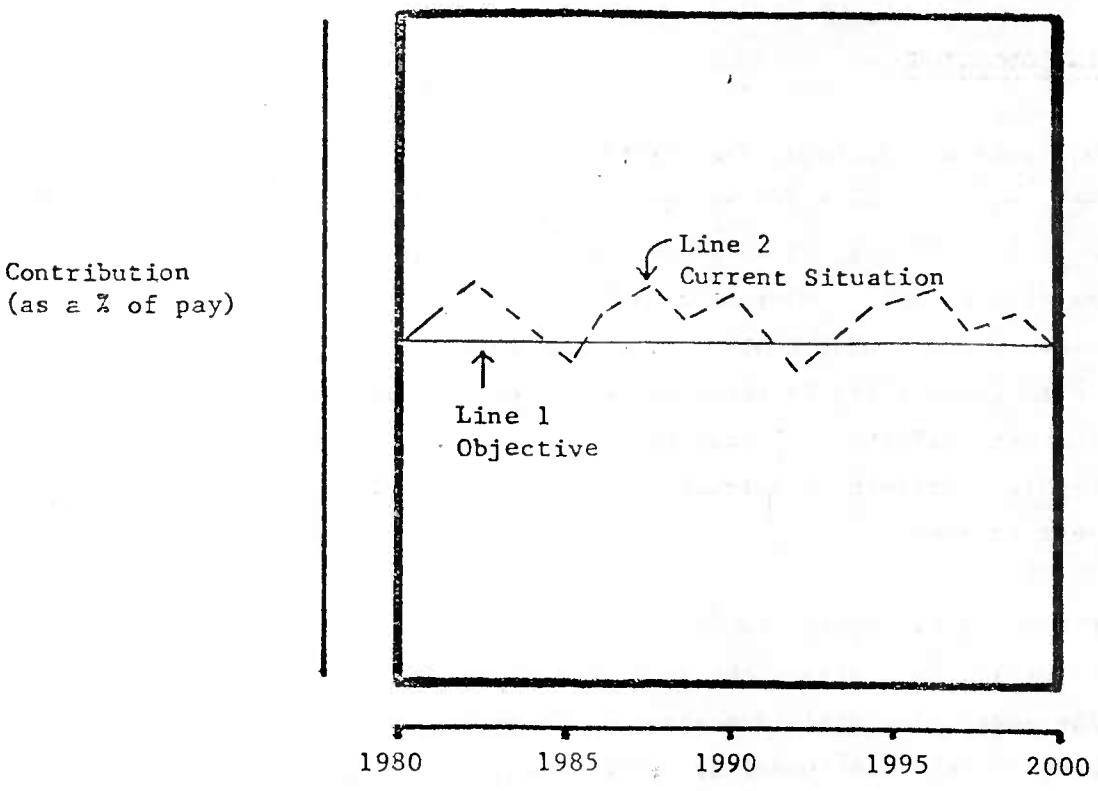
## EXECUTIVE SUMMARY

## A. INTRODUCTION

Milliman & Robertson, Inc. (M&R) became the new consulting actuaries of the Maryland State Retirement Systems (MSRS) on July 1, 1982. In carrying out our first valuation of the Systems we discovered a number of administrative and technical procedures used in developing costs in the past which we believe contribute to an instability in the long-term financing of the Systems. Our further analysis convinces that the current procedures lead to highly uncertain, difficult to predict, patterns of costs from year to year.

The benefits payable by law control the ultimate costs of MSRS. Actuaries only affect the incidence of those costs year by year. The underlying goal of most sound financing arrangements is to have the systems funded by level annual costs when expressed as percentages of payroll.

The problem is illustrated by the graph on the following page, which was presented to the Board at its February 8, 1983 meeting. Line 1 is the type of cost pattern which is desirable. Recent experience, however, has confirmed that annual costs of MSRS are not stable (line 2). This instability leads us to believe that the actuarial methods and procedures used in the past are not satisfactory.




At the February MSRS Board of Trustees meeting, we proposed to undertake an in-depth study of the financing of the Systems. Four areas are of particular concern to us:

(1) the interaction between the Retirement and Pension Systems, both for teachers and for general employees
(2) the budgeting process of the State of Maryland
(3) the allocation of total plan costs between the State and local participating units, and
(4) various actuarial procedures used in determining annual costs

## B. RECOMMENDATIONS

Summarized below are our recommendations. These are discussed in more detail in Part II of this report. Our cost analysis is presented in the Appendix.

### 1. Change in Current Actuarial Cost Method

The Entry Age Actuarial Cost Method should be adopted to replace the current method (Unit Credit). The modification of the Entry Age method which we recommend results in a more stable progression of employer contributions (expressed as percentages of payroll) from year to year, when compared to the current method.

### 2. Unify the Contribution Rates of the Pension and Retirement Systems

For the purposes of determining the total employer costs, the two Teachers' Systems should be treated as a single system, as should the two Employees' Systems. The approach does not mean that the systems should necessarily be merged. The recommendation is intended to eliminate the overall distortion in actuarial costs of the systems created by transfers of members from the Retirement to the Pension Systems.

### 3. Change in Valuation Date

A nominal change in the valuation date from June 30 to July 1 should be made. The valuations will then clearly be based upon July salaries, including any changes effective on July 1.

The valuations will also reflect any cost-of-living increases taking effect on the same day.

4. Examine Alternative Approaches to State/Local Cost Allocations

The present method of allocating costs between the State and local units should be revised to be more equitable. By making these revisions, however, the total costs of the Systems will not change. Rather, a redistribution of costs will most likely occur, in aggregate, between the State and locals and secondarily among the local units themselves. Since this problem is not a financing issue but a policy issue, and since no one method can be described as the best method, we are presenting alternative approaches for consideration. In Part II, Section C, we discuss the advantages and disadvantages of several alternatives for further study.

5. Modify the Current Method Used to Value Plan Assets

The fixed income securities of each system should be valued in a manner consistent with the actuarial assumptions used for valuing the commitments of that system. The method we recommend has the advantages of immunization and dedicated bond portfolios, without giving up the flexibility of the current investment procedures.

6. Anticipate Budget Lags

The revised valuation procedures should recognize that implementation of the calculated employer contribution rates will occur many months after the valuation date. The revised

methods will take into account all employer commitments before the recommended rates can be implemented.

7. Improve Disclosure Methods

The status of all of the systems in the State is of importance to a number of observers, particularly in the financial community. Our recommendations will clarify the disclosures given and cause them to be consistent with all current requirements.

8. Unify Reporting of Results

As a convenience to the Board and other interested parties, we will prepare a consolidated report of future valuations of all the Maryland systems. This will eliminate duplication and make the resulting document more readable and understandable for reference purposes. More importantly, however, this approach will emphasize the overall financing of the Systems as a whole, rather than individually.

9. Involve State Actuaries in Budget Planning

The actuaries for the State's systems should be more closely involved in the budget planning sessions which occur in the summer in preparation for the upcoming legislative session.

10. Do Not Modify Actuarial Assumptions

The actuarial assumptions should not be changed at the present time. Actual experience of the MSRS was reviewed most recently in 1980 and there has not yet been sufficient time

for additional experience to disclose a significant change in experience trends. However, as indicated in paragraph (5) above, we recommend a change in the asset valuation method to give better recognition to changing rates of investment return.

C. COST IMPACT

Earlier this year, we presented the reports of our June 30, 1982 valuations of the State's retirement and pension systems. We certified that the total State contribution rate should be 16.77% of payroll, based on the actuarial procedures in use. The rate we certified was 0.49% below the rate we actually calculated, the difference being the result of the continued phase-in of the effect of 1981 changes in actuarial assumptions for both Teachers' systems. Without that phase-in, the contribution rate would have been the 17.26% rate we actually calculated.

If our recommendations had been in effect at the time we prepared the 1982 valuations, the total contribution rate for the State, including the 0.49% cost for the assumption change described above, would have been 16.66% of payroll. Thus, our recommendations would have resulted in a 0.60% reduction in the calculated total employer contribution rate. This translates to a $16 million reduction in fiscal year 1984. More important than the actual cost figures, though, is our expectation that the recommended procedures generate contribution rates which will be much better predictors of the payroll percentages to be calculated in future valuations.

# PART II

## ANALYSIS OF RECOMMENDATIONS

## Section A

## Retirement versus Pension Systems

### 1. The Problem

Separate financing of the old and new systems for teachers and for other employees has generated unstable costs for the systems. All new employees enter the new systems, causing the old systems to become gradually smaller. Since the new systems carry substantially lower costs than the old, the overall costs should decline as the new systems become larger. However, the shifting pattern is irregular. Moreover the current cost method (Unit Credit) interacts with this cost shifting and contributes to the instability.

### 2. Recommended Solution

- Change to Entry Age Actuarial Cost Method

- Unify the Contribution Rates of the Pension and Retirement Systems

### 3. Analysis

Many reports have documented the pension problems the State of Maryland faced until a few years ago. These reports, by prestigious consulting firms, discussed the problems themselves and recommended solutions.

The old retirement systems provide generous benefits, with cost-of-living provisions which are unprecendented among major state-wide systems. Although the benefits paid by the old systems were well received by the employees, the staggering costs were recognized to be beyond the capacity of the State to continue to bear.

As a result, after a great deal of political infighting, two new "Pension" systems were established, as contrasted with the old "Retirement" systems. Benefits provided by the Pension Systems are much less generous than those of the Retirement Systems, particularly as to projected cost-of-living increases after retirement. With limited exception, all employees hired after December 31, 1979 automatically join the Pension Systems. In addition, members can effect a substantial reduction in their own contributions by electing to transfer from the old to the new systems. As a result, the commitments of the State and other retirement system employers have been reduced.

A good measure of the difference in ultimate costs for the Retirement and Pension Systems is the "normal cost" under the entry age actuarial cost method. This will be discussed in more detail later. In brief, though, the normal cost under this method represents the average cost to the employer to pay for the benefits of new employees under the system. (Unfunded actuarial liabilities do not exist for new employees and therefore are not considered when analyzing ultimate costs.) Exhibit A-1 indicates the comparative normal costs for a typical new employee, expressed as payroll percentages, of the old and new systems of the State.

EXHIBIT A-1

Comparison of Employer Costs
(Old Systems vs New Systems

| System | Teachers | Employees' |
|---|---|---|
| Old (Retirement) | 10.34% | 8.36% |
| New (Pension) | 7.50% | 6.50% |

The exhibit above indicates the dramatic cost effect of the 1978 legislation (an ultimate cost reduction of about 25%). It would also seem to promise early relief from the enormous tax burden that the existing retirement systems were becoming. As old employees are replaced with new employees, employer costs will shift from the high range to the low range. However, the 1982 valuation proved this assumption to be woefully inappropriate. What is the problem? Where are the cost reductions promised by the hard-fought legislation? Unfortunately, the answers are somewhat complex, and deal in the arcane area of actuarial science.

The primary culprit, in our opinion, is the actuarial cost method that was adopted concurrently with the revised systems. In reconstructing the history of the studies available to the legislature at that time, we note that the effects of the shift to the current actuarial cost method were studied, as were the changes in costs resulting from the adoption of the new systems, but the two were never looked at as a package. No projections

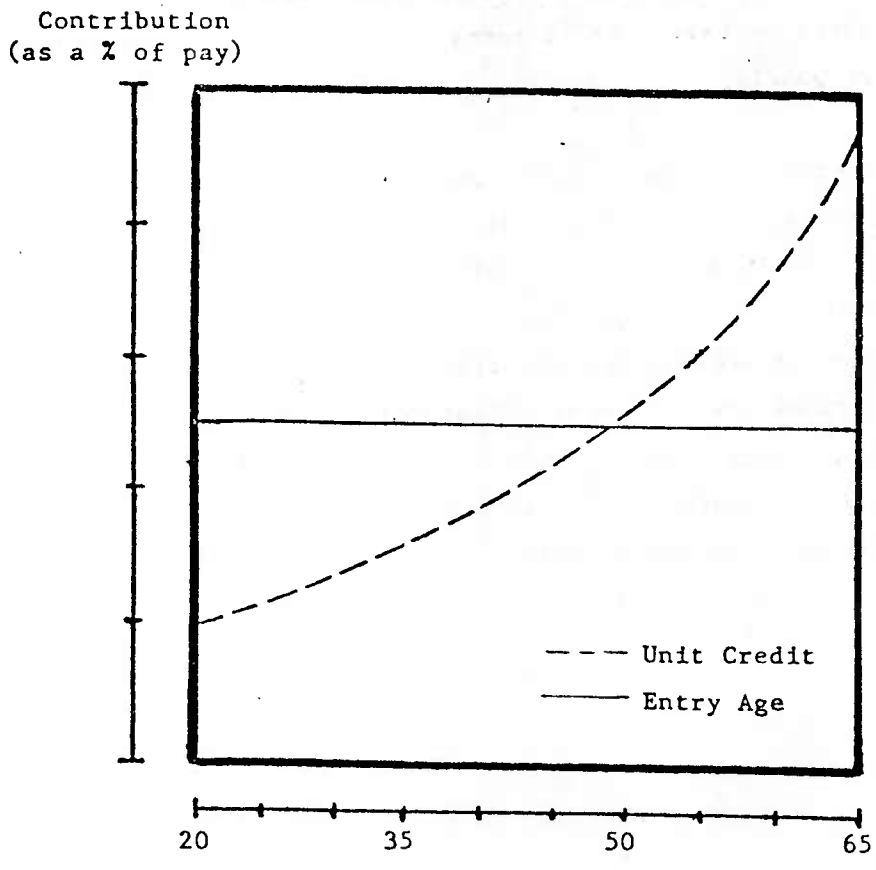
were made to show how the unit credit actuarial cost method (the method adopted in 1980), would handle the shifting costs of the revised systems. As it turns out, the method handles these shifts very poorly.

To understand the problem, one must delve a bit into some of the technical aspects of actuarial cost methods. We will be focusing on two such methods, the Unit Credit Actuarial Cost Method currently in use, and the Entry Age Actuarial Cost Method, the method we propose for adoption at this time. Each of the methods generates its own level of unfunded liability, but that is not as significant to this discussion as the normal costs created by the two methods. Exhibit A-2 below graphically illustrates these two funding methods.

EXHIBIT A-2

Comparison of Costs

Unit Credit vs. Entry Age Normal




In each method the normal cost is the portion of the overall actuarial cost which is assigned to a particular year by the method. All actuarial cost methods generate normal costs which will pay for all of the benefits which an employee will earn during his lifetime. The difference between any two methods is in the incidence of the costs--each method has its own characteristics of expected trends in the normal costs.

For the unit credit method, the costs for an individual will increase as the member grows older. This effect is a result of the way the normal cost for any year is calculated. First the actuary determines the benefits earned by the member during the year. The normal cost, then, is the money that must to be set aside to buy these benefits. Early in an employee's career, the normal cost is low, since it will have many years to earn interest before it is paid out for the benefit earned during the year. Late in a career, on the other hand, the normal cost becomes quite high, since the same amount of benefit is being earned during the year but must be paid out much sooner. This effect is compounded by the increased likelihood of actually paying the benefit as the employee gets older (i.e., probability of dying, becoming disabled, etc.).

The last paragraph described how normal costs are calculated under the unit credit method and why they <u>increase</u> with age. In contrast, under the entry age method, the costs are <u>level</u> as a percentage of pay. This characteristic is a basic part of the methodology used in the entry age method. The effects are probably best illustrated by taking any of the systems (the patterns are similar in all) and comparing employer normal costs at various ages. For example, Exhibit A-3 below shows the normal costs, expressed as percentages of payroll, of the Teachers Retirement System at various ages for an employee hired at age 25.

EXHIBIT A-3

Comparison of Normal Costs for
Actuarial Cost Methods

| Attained Age | Unit Credit | Entry Age |
|---|---|---|
| 25 | 4.94 | 9.66 |
| 35 | 8.56 | 9.66 |
| 45 | 14.24 | 9.66 |
| 55 | 17.04 | 9.66 |

In normal circumstances, the increasing costs for the unit credit method cause no problems. The total normal cost is the sum of individual normal costs. The average amount generally does not change significantly from year to year, since the average age of a large group tends to be very stable.

In Maryland, however, the circumstances are not normal. The average normal cost for the old retirement systems is guaranteed to become higher and higher under the unit credit method, since new, low cost employees are not being added to lower the average.

The situation is no better in the new pension systems. Here, the average normal costs are also increasing over the years under the unit credit method. This is because most of the employees in the system start off relatively young. However, the average age will creep up as they grow older, even though new members will all join that new system. The average normal cost will increase along with the average age.

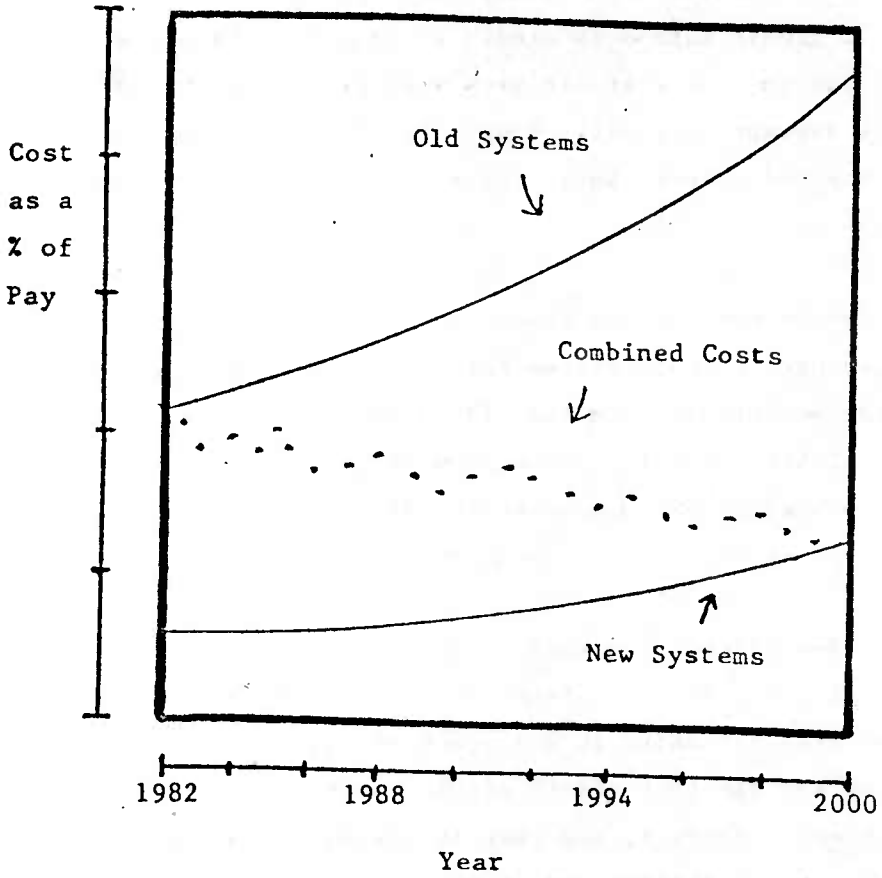
All of this results in a dynamic and unstable situation as long as the unit credit method is used. If no one quits or retires in either system, the costs in each will tend to go up so that the overall average cost will go up. On the other hand, as employees leave the old system, their replacements come into the new, lower cost system.

Thus, two countervailing forces are at work, the increasing average costs in each system versus the decreasing costs caused by shifting membership from the old to the new systems. The net result of the overall process results in total costs that are highly unpredictable and volatile, since they depend upon the short-term shifts in employment as they occur.

Exhibit A-4 illustrates this effect by showing idealized flow of actuarial costs as percentages of pay. Both the old and the new systems are increasing in average costs by themselves. The combined average cost starts off at essentially the level of the old systems. However, the cost is highly dependent upon the mix between the two systems and is therefore unpredictable. Incidentally, this chart does not attempt to portray the effects of some of the other factors leading to instability in the systems, as are discussed later in this report.

EXHIBIT A-4

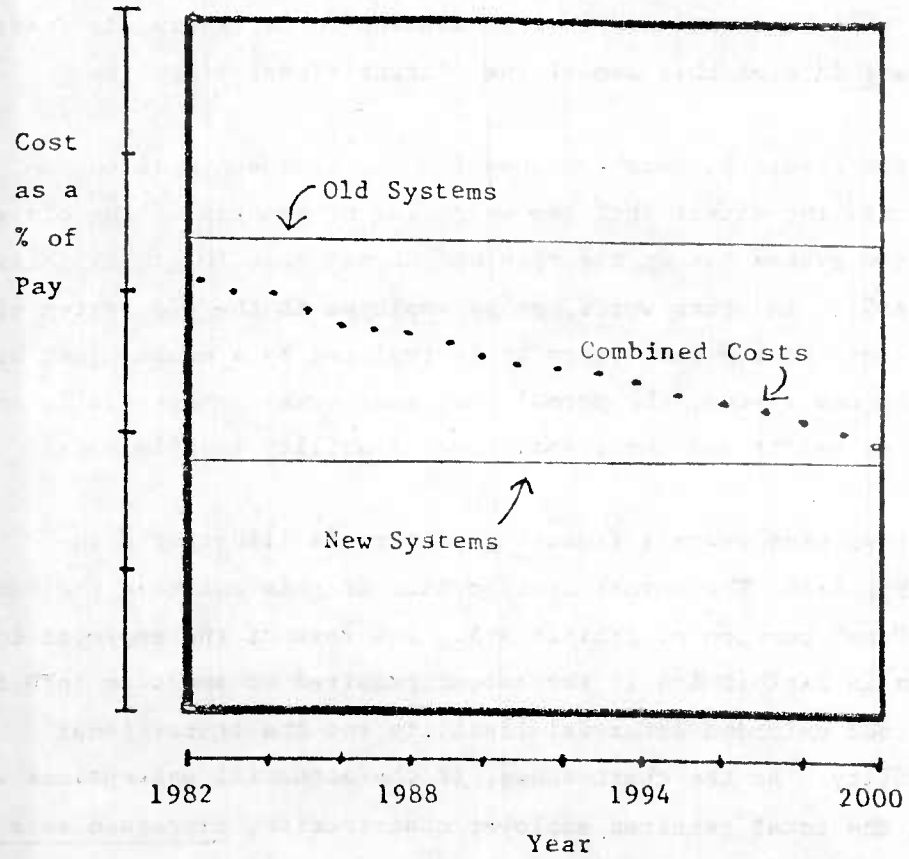
Unit Credit Costs




A shift to the entry age cost method can provide the major portion of the cure of the problem portrayed in Exhibit A-4. This is illustrated in Exhibit A-5. Here the cost of each of the old and new systems will be forced to be a level percentage of pay. The combined cost will never increase (if experience follows the actuarial assumptions). The rate of decline from the normal cost rate of the old system to that of the new is still unpredictable, depending upon the relative weighting of the membership in the two systems. However, the fact that the rate should not increase is certainly more palatable than the possibility under the unit credit method of increasing costs from time to time.

EXHIBIT A-5

Entry Age Costs




We are recommending one final step in smoothing the cost pattern. This is to combine the Retirement and Pension Systems for funding purposes only. The combining of the systems would mean that assets, payroll, actuarial liabilities, and contribution rates would be commingled for calculation and presentation purposes. In addition, the lower entry age normal cost of the new systems (when

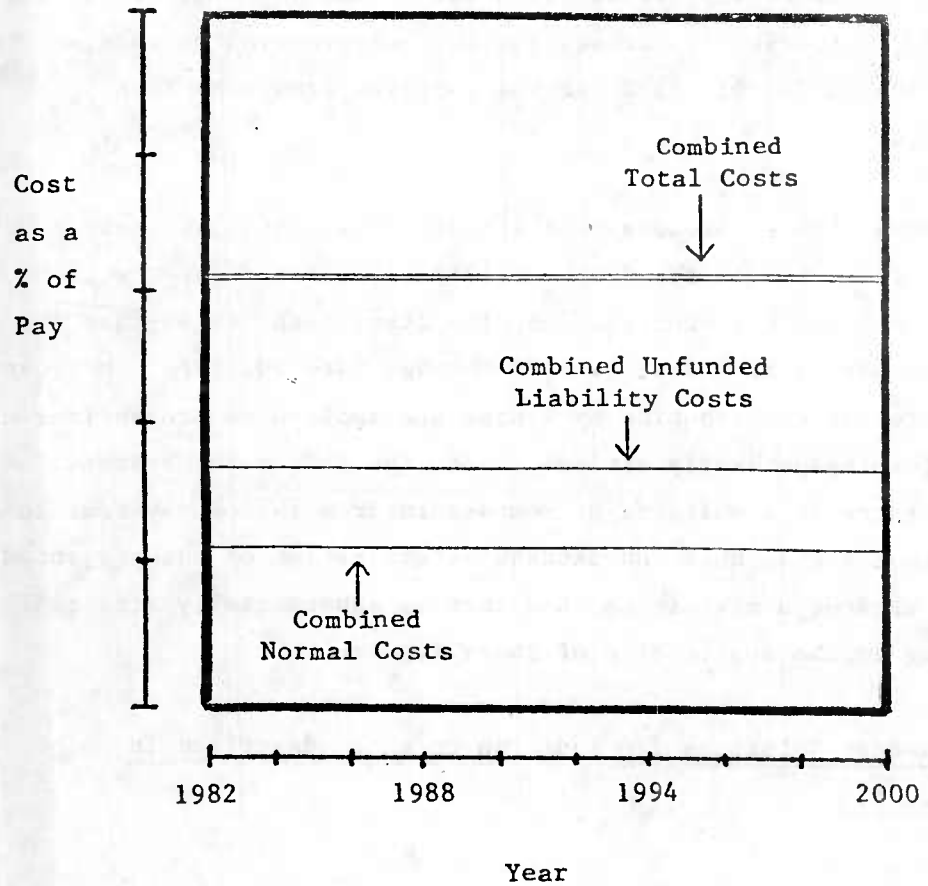
calculated separately) would be assigned to all members whether they are in the old or the new system. The difference between the higher, old system normal cost and the lower, new system normal cost will be translated into an element to be separately funded. We have labeled this amount the "transitional liability."

The end result of this combined funding approach will be to minimize the effect that the weighting of members in the old and the new system has on the combined normal cost (e.g., Exhibits A-4 and A-5). In other words, as an employee in the old system either transfers to the new system or is replaced by a member just hired in the new system, the normal cost rate remains essentially the same as before and the transitional liability is eliminated.

The resulting overall financing pattern is illustrated in Exhibit A-6. The normal cost portion of this chart is the same as the "new" portion of Exhibit A-5. The rest of the employer cost shown in Exhibit A-6 is the amount required to amortize both the combined unfunded actuarial liability and the transitional liability. As the chart shows, if the actuarial assumptions are met, the total required employer contribution, expressed as a percentage of the payroll of the combined systems, are expected to be level until the "liability" amounts are amortized in the year 2020.

EXHIBIT A-6

Entry Age Costs with Combined Funding



## Section B

## The Budget Process

### 1. The Problem

Actuarial cost figures for the systems are presented as if they were instantaneously effective on the valuation date. Thus, our June 30, 1982 figures assume that the contribution rates are effective on July 1, 1982 for the employee groups as then constituted.

The actual budget process substantially distorts this, however. In the first place, the June 30, 1982 valuation figures will be first used for the contributions for fiscal year 1984--that is, for the period from July 1, 1983 through June 30, 1984. Moreover, the rates of contribution by system are applied to projections of salaries independently arrived at for the four major systems. Since there is a shifting of membership from the old systems to the new systems, this independent determination of the projected costs creates a distortion, one that is substantially affected by the lag in the application of these figures.

### 2. Recommended Solutions (In addition to those described in Section A)

- Change the Valuation Date

- Anticipate the Budget Lag

- Include State Actuary in Budget Planning

3. Analysis

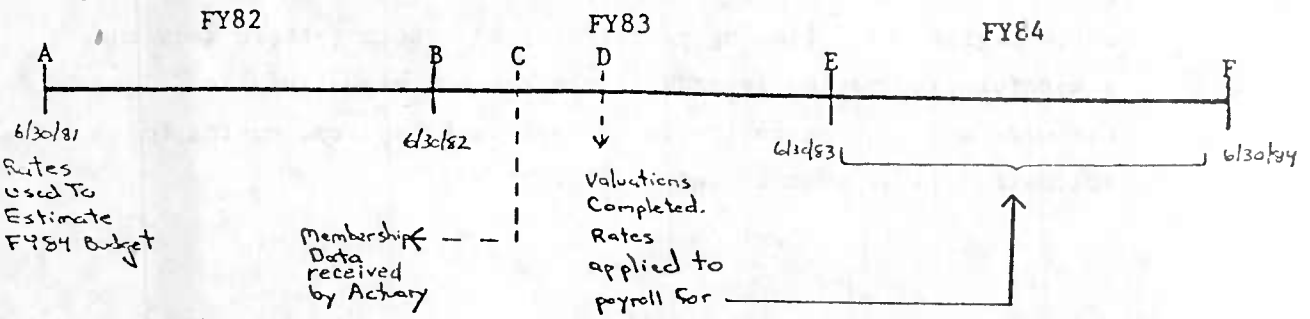
Prior to the 1982 valuations of MSRS, actuarial cost figures would not be used until the fiscal year beginning two years following the valuation date for the State, and one year following for local units.

This situation was recently improved so that the June 30, 1982 valuation figures will be applied to the fiscal year beginning one year following the valuation date (FY84) for both the State and local units. The one-year catch up in the State's time lag was brought about by completion of the actuarial valuation by December 1, 1982, in time for inclusion in the FY1984 budget.

In many situations, one-year time lags do not create significant problems, since actuarial valuations produce contribution rates which remain nearly level from year to year. However, if a tendency for fluctuation of rates already exists, as it does under current procedures in Maryland, the lag aggravates the instability. Any swings which occur are whipsawed by the delay in effecting the new contribution rate.

The Current Budget Process of the State of Maryland, as It Relates to the Financing of MSRS

In the following diagram is a portrayal of the budget process as it relates to MSRS financing.



- As of June 30 of each year (Point B, for example), a "snapshot" is taken of the membership data and financial position of the System's funds for each of the six systems, providing information such as:

    - a headcount of the active and inactive membership on that date
    - dates of birth, hire, termination and retirement for each member
    - current pay levels for active members, and benefits in pay status for inactive members
    - the value of pension fund assets

- On July 1 (Point B), general pay increases for active members and cost-of-living adjustments (COLA's) for retirees and beneficiaries take effect.

- Membership and financial information are provided to the actuary in September (Point C). The delay to September is short when compared to what we have encountered for other large systems, and is primarily due to the time needed to:

    - process employment and termination applications
    - determine deaths or disabilities that have occurred
    - obtain and process necessary data from local governmental units

- Between June 30th (Point B) and September (Point C), budget planning sessions take place, in preparation for the fiscal year which begins the following year (Point E). During these sessions, a careful examination is made of the current membership to estimate what the payroll will be, system by system, during the following fiscal year (Point E to Point F).

- The estimated budget appropriations for MSRS are determined by multiplying the payroll estimates for each system by the corresponding contribution rate certified by the actuary. At this point, however, the only contribution rate available is the rate certified two years prior (Point A) to the beginning of the fiscal year (Point E to Point F).

- During the months of September, October and November (Point C to Point D), the actuary performs the necessary analysis to determine the plan contribution rate for each system as of June 30th (Point B). On December 1st (Point D), these certified contribution rates are presented to the Board of Trustees, and are used in determining the actual budget appropriations for the following fiscal year (Point E to Point F).

The end result of the valuation process is the contribution rate (as opposed to dollar amount of contribution) to which the actuary certifies. As long as the rate remains relatively constant from year to year, little problem is created by this budget process. However, the MSRS financing approach involves four interrelated factors, which are not reflected in the budget process and which result in a fluctuating contribution rate:

- The current funding method utilized by MSRS (Unit Credit)

- The transfer of members from the old systems to the new systems

- The scheduled "phase-in" of costs with respect to the Teacher's Retirement and Pension Systems

- The time lag between the date that the contribution rate is determined and the date that the rate is applied to existing payroll.

- o Current Funding Method - Plan costs are now calculated using the unit credit actuarial cost method. As discussed in more detail in Section A, even if all actuarial assumptions are realized, the contribution rate for a closed group of active members (such as are in the retirement systems) is almost guaranteed to increase from year to year. Thus, the budget estimates developed in the summer budget planning sessions (based on the prior year's actuarial rates) will almost certainly be lower than the actual budget requirements based on the current year's rates. Table B-1 below shows how this "shortfall" developed in the Teachers' Retirement System for fiscal year 1984.

TABLE B-1

FY84 Budget Appropriation

Teachers' Retirement System

| | | |
|---|---|---|
| A. | Budget Appropriation Estimate | |
| 1. | Estimated payroll for FY1984 | $1,101,963,000 |
| 2. | June 30, 1981 contribution rate per Buck Co. (latest rate available) | 20.45% |
| 3. | Budgeted funds (1. x 2.) | $ 225,351,000 |
| B. | Actual Budget Appropriation | |
| 1. | Estimated payroll for FY1984 | $1,101,963,000 |
| 2. | June 30, 1982 contribution rate per M&R | 23.38% |
| 3. | Actual budget needs (1. x 2.) | $ 257,639,000 |
| C. | Shortfall (B.3 - A.3) | $ 32,288,000 |

This problem is not limited to the Teachers' Retirement System. The Employees' Retirement System and both pension systems also exhibited this contribution rate creep. The primary cause of this creep is that all of these systems tend to have increasing average ages of their membership. As long as the average age of members in any plan increases, the contribution rate will almost certainly increase under the actuarial cost method currently in use (Unit Credit).

- o Transfers in Membership - On the surface it would appear that the problem described in 1 above is only an intra-system budgetary problem, and that overall the budget requirements should be lowering as a percent of payroll because a number of members from a high cost system (Retirement) transfer each year to a low-cost system (Pension). Closer inspection reveals, however, that this does not necessarily occur, and shortfalls between estimated budget requirements and actual budget requirements may continue under the present budget approach.

  The basic problem is that the combined actuarial and budgetary process does not allow for any significant changes in membership from the valuation date to the time contributions are actually made. The actuarial cost figures are determined as of the valuation date; the salary figures used in the budget are as of some later date. The result can be an underestimate of the true requirements, even though the membership shift is favorable.

- o "Phase-In" of Increases - A problem which has existed for the past two actuarial valuations and will continue through the 6/30/83 valuation is the phase-in of costs for both Teacher's systems. In 1981 an increase in costs for both Teacher's systems resulted from a change in actuarial assumptions. The decision was made to

reflect this cost in a three-year interval ending with the 6/30/83 valuation. As a result, each year there is an automatic increase of 1.14% in the rate for the Teacher's Retirement System and 0.30% in the rate for Teacher's Pension System.

The budget process used by the State of Maryland does not anticipate this increase in the contribution rate and therefore an automatic shortfall will occur between what is estimated for the next fiscal year budget and what is actually needed. This shortfall in the FY1984 budget was $13.9 million.

o Time Lag

The most obvious problem created by the budget process is the time lag between when the actuarial contribution rates are certified, and when they are actually applied. As mentioned earlier in this section, prior to 1982 the lag was two years; starting with 1982, there is only a one-year lag. These lags have tended to accentuate the variability of the actuarial costs caused by the three problems cited earlier (transfers, funding method, cost phase-in).

## Conclusions

The primary solutions to the problems created by the budget process are the recommendations found in Section A of this report: change the actuarial cost method and unify the contribution rates of the pension and retirement systems. For further fine-tuning of the budget process, we also recommend:

- The valuation date should be changed from June 30 to July 1, so that our valuation results will automatically reflect the general salary increases and cost-of-living increases that occur on July 1.

- Our valuation calculations should anticipate the budget lag, by reflecting all information available to us as of the time the calculations are being performed (September-November). This would include information such as employee transfer experience, and actual State contributions expected to be made to the systems from the valuation date until the time new contribution rates can be implemented.

- The State Actuary should participate in summer budget planning meetings with respect to cost expectations for the following fiscal year. For example, during the FY1984 budget planning session which took place in 1982, the FY1984 payroll estimate was very close. However, in determining the budget contribution appropriation for MSRS, no allowance was made for the increase in the contribution rate to be applied to the payroll estimate. At that time, our firm had just been retained by MSRS and had little experience to aid us in counseling with respect to what the appropriate contributions should be. In future years, however, we can make better estimates and should be able to help in the budget process.

## Section C

## Local Government Units

### 1. The Problem

The present basis for financing the local governmental units was established in 1980. Assets and liabilities were then allocated to each local unit so the financing of its employees' benefits could be monitored. Similar procedures were used for reallocating assets in subsequent valuations.

After thorough analysis of the procedures, we are concerned about the equity in cost allocation:

a. between the State and the local units as a group, and
b. among the local units by themselves.

Although questions of equity among the employers are involved, this problem does not impact on the total MSRS costs, but only upon the allocation of those costs among the contributors to the systems.

### 2. Recommended Solution

- Examine Alternative Approaches to the Allocation of Total Costs among the Systems' Contributors.

### 3. Analysis

During its 1979 Session, the State Legislature enacted major pension reform legislation which established new pension systems

for employees and teachers. The new pension systems provided for lower benefit levels than the old retirement systems.

In addition to the establishment of the new systems, the 1979 legislation called for a change in actuarial funding procedure for the June 30, 1980 and all subsequent valuations of the systems. Previously, the pension guarantee portion of the retirement allowance and the post-retirement increases in allowance were financed on a pay-as-you-go or cash disbursement basis. The new legislation required that all benefits, including the two mentioned above, be funded on a full actuarial reserve basis and that the accrued (unit credit) actuarial cost method be utilized.

As a result of these changes, "unfunded accrued liabilities" for each local unit and for general State employees as a group were redetermined as of June 30, 1980 (prior determinations had been made for local units as of July 1, 1973). These unfunded accrued liabilities, by law, are to be amortized (i.e., fully funded) over forty years. The State's portion of the unfunded accrued liabilities are to be amortized as a level <u>percentage</u> of payroll each year, and the local units' portions as level <u>dollar</u> amounts.

Much concern has been expressed about how "unfunded accrued liabilities" were calculated and allocated among the employers in 1980. In this regard, three points should be considered:

- By rights, the allocation should have been an <u>accounting</u>, rather than an <u>actuarial</u> function. Actuarial calculations are based in large part upon predictions of the <u>future</u>; accounting calculations are generally analyses of transactions in the <u>past</u>. The 1980 allocation was essentially of the latter type.

- Reconstructing past cash flows (contributions, investment income, benefit payments) of a pension fund so as to allocate current assets is almost impossible, and may also be inappropriate. Contributions to a pension fund are generally not earmarked for an individual member but rather for a group. Similarly, employers share the risk for various types of benefit payouts, so as to take advantage of averaging techniques.

- Any method used to allocate pension fund liabilities and assets, other than a complete reconstruction of past events, is arbitrary.

The method adopted in 1980 may or may not have been the best approach to allocating assets and liabilities, but it certainly was reasonable. It involved two steps. First, the existing assets of the Employees' System were allocated. This was done by comparing total Employees' System assets to total Employees' System actuarial liabilities, based upon the actuarial cost method then in use, the entry age method. Each employer's "funded ratio" (assets divided by liabilities) was then multiplied by its actuarial liability (also based on the entry age method) to determine the assets allocated to each unit. Each local unit and the State employees as a group were thus considered to be in the same funded position as of June 30, 1980, based upon the old actuarial cost method.

The second step in the 1980 method was to allocate liabilities. Again, this was done for each group on an individual employee basis. For this purpose, the determination was made on the newly adopted actuarial cost method, the unit credit method. The excess of the liability as calculated over the allocated assets for each employer became the "unfunded accrued liabilities" to be amortized over forty years.

As stated above, we believe this method was reasonable. If another approach had been used, the result would simply be a redistribution of the unfunded accrued liabilities among the local units themselves, and between the local units combined and the State. Some would owe more, and some would owe less. It is not clear, without performing a new calculation, who was favored by the approach actually used.

For discussion purposes, assume that the 1980 allocation of unfunded liabilities was equitable and exact. Questions still remain concerning the annual amortization payments needed to fund the resulting allocated liabilities. The tables used to determine the forty-year level-dollar payments for the local units contained one minor error. The factors in these tables assume payments at the end of each year, whereas the actual payments are due in mid-year. This results in the State having interest-free use of the local units' payments for six months. To correct this error, the local units' payments will have to be adjusted downward by approximately 3.5%.

A more significant issue concerns the respective patterns of the payments of the local units compared to the State. The minimum annual repayment terms for the local units are based on a forty-year level-dollar basis. The State, on the other hand, is repaying its initial unfunded accrued liability on a forty-year level percent of pay basis. The difference between these two bases is summarized in the table below for an employer paying a level $100 per month.

TABLE C-1

Comparison of Level-Dollar vs
Level Percent of Payroll Amortization Payment

| Amortization Payment | (Local Units) Level-Dollar | (State) Level % of Pay |
|---|---|---|
| First Year | $ 100 | $ 50 |
| Tenth Year | 100 | 78 |
| Twentieth Year | 100 | 127 |
| Thirtieth Year | 100 | 207 |
| Last Year (40th) | 100 | 337 |

Due to this different repayment approach, the local units' unfunded accrued liability payments are currently about twice as large as they would have been had those payments been computed as the State's had been. On the other hand, in forty years, the local units' payments with respect to this initial liability will be less than one-third of the payment that they would make on the State's basis.

The level dollar basis is different from the rest of the funding approaches in use for MSRS. We understand it was adopted for the local units because of uncertainty as to their steadily increasing payroll for forty years as assumed under the level percent of pay approach. Obviously, a counter-argument would have been that a level dollar approach puts a heavy burden upon the local units in the early years.

The allocation problems did not end with the 1980 process. Starting with the June 30, 1981 actuarial valuation, approximate methods and procedures have been used which impact on the cost allocations between the State and locals, and among the locals. These methods and procedures appear to be inequitable in two respects:

- Total plan assets in both the Employees' Pension and Employees' Retirement System are reallocated each year on a pro-rata basis, reflecting the liabilities of each group but ignoring actual contributions made. This affects the cost allocation between the State and local units combined, as well as among the local units themselves.

- When a local unit employee transfers from the Retirement to the Pension System, the resulting substantial decrease in liability is spread among all locals rather than being credited to the local unit to which the employee belongs. This only affects the cost allocation among the local units themselves.

The cost impact of these two inequities has probably not been substantial, since only two valuations have been performed since 1980. If these calculation procedures are continued, however, they will produce anomalies and inequities which grow with each passing year.

One other shortcoming of the current valuation procedures involves the way the cost results are presented to the local units. In the past, the actuarial reports identified two components:

- the normal cost, and

- the unfunded accrued liability payment.

The second piece, the unfunded accrued liability payment, is presented to reflect the outstanding balance of the unfunded liability allocation made in 1980. What has happened to any experience gains and losses, such as losses attributable to salary increases and cost-of-living increases since 1980?

The answer can be found by examining the difference between the State's normal contribution rate and the local units' normal contribution rate for the Employees' Retirement System. On June 30, 1982, the local units' normal rate (13.34%) was about 22% higher than the State's rate (10.36%). Two factors contributed to this disparity.

- The difference in the age/service/salary characteristics of the two groups

- Additions to the normal cost attributable to local units of the payments required to amortize the unfunded accrued liabilities resulting from experience losses since 1980.

Generally, normal cost differences reflect only the first factor above. Experience losses normally affect the unfunded accrued liability. However, the MSRS methods result in a presentation of the unfunded accrued liability as only the remaining portion of that allocated in 1980 to each local unit. This is actually only a part of the actual unfunded accrued liability allocated to each unit. On the other hand, unfunded accrued liabilities attributable to the State are presented in full. This partially explains the steady increase in unfunded accrued liabilities for the State during the past few years, while no increases appeared to occur for local units. In actuality, of course, all employers were experiencing losses. The cost allocations were not affected by this approach, incidentally; the only effect was on the disclosure.

4. Alternatives

In our opinion, the State versus local units' allocation issue has been handled poorly in the past, both in terms of procedures used and the communication of these procedures. Unfortunately, however, these problems have evolved into a complicated and

involved situation. The whole purpose of having both the State and local units in the same systems is not to benefit one side at the expense of the other, but to enable both sides to benefit from the advantages resulting from large size, which are considerable.

As we mentioned earlier, this issue is one of allocation policy and not of financing. For that reason, and because no one best solution exists, we feel it is inappropriate for us to make a single recommendation as to the approach to be used to allocate total system costs.

However, we have developed below several alternative approaches for consideration; for each approach we list the major pros and cons. The final decision with respect to which alternative is best depends upon the overall goals and objectives of the State and local units in their participation in MSRS.

Alternative 1: Complete merger of State and local units' participation in the Employees' Pension Retirement Systems.

This alternative would eliminate any need for separate determination and disclosure of costs between the State and the local units. The same contribution rate (normal and unfunded) would apply to all and there would be no need for separate unfunded accrued liability calculations or payments for the local units. New local units entering the systems would also pay the same contribution rate. However, any local unit leaving the system would have to be assessed its pro-rata share of the total system unfunded liability, based on benefits earned to the date of withdrawal.

This approach, which is used by most multiemployer pension plans in the private sector and by many other Statewide systems, reflects complete cost sharing.

Major Advantages:

- o Simplicity in understanding and administration
- o Minimizes the risk of adverse plan experiences affecting either the State or local units
- o Eliminates the need to allocate unfunded accrued liabilities to local units
- o Least expensive to administer in the long run

Major Disadvantages:

- o May deter new local groups from entering into the system until current unfunded liabilities are paid off.
- o May be inequitable to local units who
  - have recently entered the system
  - have paid off their 1980 accrued liability assessment
  - have younger age and lower service characteristics than the composite system.

Alternative 2: Maintain current approach modified to correct any technical errors or inequities.

This alternative is intended to provide a patchwork solution to the current approach. This would be accomplished by (1) adjusting

the amortization payments made by local units, (2) recalculating the 1980 unfunded accrued liability determination as of June 30, 1980, June 30, 1983 or some other date, and (3) developing methods and procedures in determining costs which reflect actual contributions made and actual employee transfer experience of the local units (i.e., a better allocation of plan assets, and specific allocation of transfer experience for each local unit).

Major Advantages

- o Probably has the least impact (plus or minus) on the current State and the local units' allocation of liabilities and costs.
- o Maintains current administrative procedures with minimal change.
- o Least amount of work to incorporate.

Major Disadvantages

- o Maintains current level-dollar amortization costs for local units.
- o May impact on hiring and dismissal procedures of local units, as additional cost for retirement system members is directly borne by each local unit.

Alternative 3: Maintain current commingled administration and investments, but separate accounting for State vs combined local units.

This alternative would require an initial split of assets and liabilities between the State and local units as of the separation

date with separate accounting prospectively of assets, liabilities, and annual costs. Administration and investment services would remain merged but future plan financing of the State would be independent from the local units.

Major Advantages

- o As long as an equitable initial split of assets and liabilities can be made, this alternative should eliminate all future arguments of inequities between the State and local units.

- o At least initially, this approach should not have a significant impact on ongoing costs.

- o If structured properly, this approach might allow the local units to collectively amortize their unfunded accrued liabilities as a level percent of pay, thus lowering current unfunded accrued liability payments.

Major Disadvantages

- o An equitable determination of the initial split of assets and liabilities may be impossible as a redistribution of current costs will undoubtedly result in substantial increases for some groups.

- o May cause the need for the local units to have their own Board of Trustees which adds to the current costs of administration.

Alternative 4: Maintain current commingled administration and investments, but separate accounting for State and each individual local unit.

This alternative is identical to Alternative 3 with respect to the State's portion (current and prospectively). For the local units, this approach will be identical to Alternative 3 only in the first year, as prospectively separate accounting for each local unit will result in separate reflection of plan experience (i.e., no cost sharing among the local units).

Major Advantages

- o Prospectively at least, this approach should not only eliminate any questions of inequity between the State and the local units collectively, but also among the individual local units themselves.

Major Disadvantages

- o Very expensive and complicated to administer.
- o Greatest potential for cost fluctuation for the local units.

Alternative 5: Separate systems for the State versus the local units

This alternative results in a total splitting off of all local units within MSRS. All unfunded accrued liabilities attributable to local units as of the date of separation (including those generated after 1980) would have to be paid by the local units.

Major Advantages

- o The ultimate in individual equity.

Major Disadvantages

- o High cost of administration
- o Adverse impact on current investments
- o Potential loss of benefits for local unit members
- o Most complicated of all alternatives

## Section D

## Other Actuarial Procedures

1. Concerns

   a. Much publicity has been given to a number of private and public pension funds in their recent decision to utilize "bond immunization techniques" (also known as "dedicated bond portfolios"). What applicability does this have for the MSRS?

   b. The disclosure of unfunded accrued liabilities in the bond prospectus material prepared by the State of Maryland impacts upon the ratings given by bond houses to Maryland's bonds. This issue is particularly important when considering the steady increase in unfunded liabilities experienced in recent years and the confusing presentation of different liabilities for different purposes.

   c. In the past, six separate valuation reports representing the six systems have been prepared for the MSRS. This situation makes comparisons difficult and does not enable the Board Members to focus on MSRS as a whole.

   d. The appropriateness of actuarial assumptions used by the actuary, particularly the rate of investment return, has been discussed at recent Board of Trustees meetings.

2. Recommended Solutions

a. Change the Asset Valuation Method

b. Improve Disclosure Methods

c. Present a Unified Report

d. Do Not Modify Current Actuarial Assumptions

3. Analysis

a. Change in Asset Valuation Method

One method of recognizing high current yields on fixed income investments is to utilize a "bond immunization technique" where a specific bond portfolio is selected with a cashflow to match pension plan payments for a group, such as retired employees. We have studied the application of this technique to the MSRS and, because of the uncapped COLA in the Retirement Systems and the relative size of System assets and liabilities, we believe that bond immunization is not appropriate for MSRS.

As an alternative, we recommend a change in the asset valuation method.

In the past, assets have been valued using a five-year moving average of unit market values. This dampens the effect of year-to-year fluctuations in market values because of the 5-year averaging process. During a period when market values exhibit a pattern of cyclical change or of consistent increase or decrease, the change in actuarial values will lag behind the change in market values.

The recommended asset valuation method will continue to value assets in this way, except for fixed-income securities.

The method recommended for fixed-income securities is called the imputed value method. Very briefly, it causes a bond to be valued so as to yield the valuation rate of interest; that is, the rate used to determine the value of the pension system's obligations.

If benefit payments made by the system are viewed as being met, at least partially, by coupons and maturities of bonds now held as system assets, then the values of the benefit payments and corresponding bond coupons and maturities can be considered equal. System liabilities are determined by discounting the future flow of expected benefit payments at the valuation rate of interest. The equality of corresponding benefit payments and bond income is therefore maintained by discounting the bond coupons and maturities at the same valuation rate of interest; the actuarial value of fixed-income securities is found by revaluing them at the actuarial valuation rate of interest.

The result of this asset valuation method is to maintain the assumed long-term rate of interest used to value the obligations of the system while giving some recognition to the different (currently higher) rate of return applicable over the shorter term to fixed-income investments now included in the assets of the system. We estimate that the adoption of this change will have the effect of reducing the current MSRS contribution by approximately $10,700,000.

b. Improvement in Disclosure Methods

Obligations for future pension plan payments are calculated periodically for two primary purposes:

- To develop and maintain a reasonable, consistent pattern of year-to-year contributions (including the current year requirements).

- To determine the plan's current funded status.

The process of assigning pension costs to different years is the actuarial cost method. Different methods can be chosen which will assign costs in different ways. Most methods start with a projection of the estimated benefit to be paid each year in the future for each current plan participant, based on assumptions about future salary increases, mortality, employment termination, time of retirement, etc. Then the method can involve an assignment of benefits to each year of service and determination of the cost of such benefits for each year, or the assignment of costs directly to each year. The result of using different methods will be to allocate costs to years in different patterns.

In the end, the pension obligations of a plan come out the same, but they differ at any particular point in time - in much the same way that different depreciation methods yield different financial results.

The item in the actuarial valuation reports of the Maryland Systems which is called the "accrued actuarial liability" is the cost that has been assigned to prior years under the actuarial cost method used for the systems. Because each of the systems determines benefits based on an employee's compensation in the years near retirement, and it is assumed

that an employee's pay will increase over the years, part of the cost assigned to prior years reflects expected future pay increases.

The cost assigned to a particular year is called the normal cost for that year and is part of the current year's contribution requirement for the year.

If the total cost assigned to prior years is greater than existing plan assets, then the difference is called the unfunded accrued actuarial liability. This amount (together with interest) will be paid in the future in "amortization payments" as part of each year's required contribution.

Different actuarial funding methods will assign costs differently to prior and future periods, resulting in larger or smaller normal costs, unfunded accrued actuarial liabilities and amortization payments at any time. This different spreading of cost and of the unfunded accrued liabilities is only a reflection of the way the costs of the system are scheduled to be paid over time. As a result, the relationship of plan assets to accrued liabilities is not necessarily a good measure of the funded status of the plan.

The accounting profession has long recognized this problem of defining and comparing the funded status of pension plans. Accounting Principles Board Opinion #8, issued in the mid-1960's, and the more recent FAS 35 and FAS 36 have required disclosure of various items of actuarial information. This information is not necessarily related to the method used to determine annual cost and contributions.

FAS 35 and FAS 36 require disclosure of plan assets and of the actuarial present value of benefits earned in the past (without inclusion of any benefits related to future pay increases). This value of benefits, called the value of accrued benefits, is generally less than the accrued liability, in part because it does not reflect expected future pay increases. Arguments have been made that this measurement of existing plan assets against the value of accrued benefits is generally considered a better measure of a plan's funded status than the unfunded accrued liability. One such argument is that the value of accrued benefits is not dependent upon the choice of the actuarial cost method and of the assumption as to the rate of future salary increases, whereas the unfunded accrued liability is directly related to the cost method.

Recently the National Council on Governmental Accounting issued its Statement 6 on Pension Accounting and Reporting for Public Employee Retirement Systems and State and Local Government Employee Entities. The Statement includes a detailed discussion of actuarial valuation methods and the diverse requirements of different users of plan financial information. It requires that PERS annual financial statements include the actuarial present value of credited projected benefits, which includes the effect of future salary increases. A similar recommendation is made in Preliminary Views on Employers' Accounting for Pension and Other Postemployement Benefits, issued by the FASB in November 1982.

These differing approaches emphasize the considerable uncertainty remaining as to the best way to measure a system's funded status. We believe consistency in methods used by

various systems should be a primary goal in this respect. Accordingly, some measure of accrued benefits should prove better as a yardstick than the accrued actuarial liability. In any statement of the funded status of a system, emphasis should be on such a value of accrued benefits earned to date, even if accrued actuarial liabilities are also disclosed.

c. Unify Actuarial Valuation

In the past, the annual actuarial reports have been prepared individually, with a great deal of repetition, and little view to unified presentation. In the future, we plan to communicate our results to the Board in a single report which

(1) presents combined financial information in both an executive summary fashion as well as in detail,

(2) presents the same individual system by system financial information as contained in earlier reports, and

(3) eliminates the substantial duplication of information that results from having separate valuation reports.

The degree to which the actuary can effectively communicate information concerning MSRS to the Board of Trustees is extremely important. We believe better reports will help the Board in considering its decisions which are based upon actuarial findings, and will have significant impact on the long-term financial success of the systems.

d. Actuarial Assumptions

Under the terms of our contract with the Maryland State Retirement Systems, M&R must perform an experience review of the actuarial assumptions utilized in performing the annual actuarial certifications. This review is to take place as of the end of the three-year contract period. However, in light of the recent cost escalations experienced by MSRS, questions have been raised as to whether it is appropriate to perform this review immediately, particularly with respect to the assumed rate of investment return.

We do not believe changing the schedule for the experience review would be of significant value. In the first place, the time period between the last experience review (June 30, 1980) and now is shorter than we would recommend to produce significant results. Second, and more important, we believe it is unwise to focus on just one experience element in deciding whether to accelerate an experience study. Perhaps the investment return has performed better than our assumptions (7%); but other assumptions such as salary increases, rates of retirement, and cost-of-living increases for retirees (5% assumption) have more than offset the favorable investment return.

Our earlier recommendation to improve the method of valuing plan assets has the same effect as a slight increase in our investment return assumption. This may appear to contradict our recommendation to defer an immediate experience study and review of actuarial assumptions. However, our recommended asset valuation approach is more consistent with the current 7% investment assumption and will provide indirectly a method to reflect changing market conditions automatically.

# APPENDICES

## APPENDIX A

### LAW CHANGES

The implementation of the recommendations detailed in this report will require examination and possible amendment of certain sections of the Maryland Code. Outlined below are those sections which will require such examination.

| Recommendation | Code Reference(s) | Nature of Code Section(s) |
|---|---|---|
| 1. Change in cost method | 73B: Sec. 14-2(c), 2(d);<br>Sec. 26-b(2), b(3);<br>Sec. 57-b(4), b(5);<br>Sec. 89-2(c), 2(d);<br>Sec. 122-2(c), 2(d);<br>Sec. 150-2(c), 2(d)<br>88B: Sec. 56-2(c), 2(d) | Describe actuarial cost method and amortization of past service liabilities for each system |
| 2. Unify contribution rates of pension and retirement systems | 73B: Sec. 14-2(a) thru 2(e), 2(g);<br>Sec. 89-2(a) thru 2(e), 2(g);<br>Sec. 122-2(a) thru 2(e), 2(g);<br>Sec. 150-2(a) thru 2(e), 2(g);<br>73B: Sec. 161-12(c) | Define and describe Accumulation Funds<br><br>Requires maintenance of separate records for each System's assets |

| Recommendation | Code Reference(s) | Nature of Code Section(s) |
|---|---|---|
| 3. Change valuation Date | None | N/A |
| 4. State/local cost allocations | 73B: Sec. 26-b(3) | Describes amortization of past service liability applicable to municipalities |
| 5. Modify valuation of plan assets | None | N/A |
| 6. Anticipate budget lags | None | N/A |
| 7. Improve disclosure methods | None | N/A |
| 8. Unify reporting of results | None | N/A |
| 9. Involve actuaries in budget planning | None | N/A |
| 10. Do not modify actuarial assumptions | None | N/A |

APPENDIX B

PRO-FORMA ACTUARIAL VALUATION: JUNE 30, 1982

TABLE B-1 -- OLD BASIS

MARYLAND RETIREMENT SYSTEMS -- JUNE 30, 1982 SUMMARY OF RESULTS

| | Employees' Retirement & Pension | Teachers' Retirement & Pension | State Police | Judges | TOTAL |
|---|---|---|---|---|---|
| **Membership Data** | | | | | |
| Total Membership | 104,473 | 93,622 | 1,874 | 379 | 200,348 |
| Total Payroll | $1,244,147,000 | $1,478,219,000 | $29,111,000 | $11,179,000 | $2,762,656,000 |
| Total Retirement Allowances | $89,031,000 | $173,574,000 | $5,272,000 | $3,372,000 | $271,249,000 |
| **Assets and Liabilities** | | | | | |
| Assets for valuation purposes | $963,182,000 | $1,730,182,000 | $97,412,000 | $3,811,000 | $2,794,587,000 |
| Unfunded accrued liability | | | | | |
| State | $1,234,469,000 | $3,597,659,000 | $111,085,000 | $64,008,000 | $5,007,221,000 |
| Municipal | $312,749,000 | N/A | N/A | N/A | $312,749,000 |
| **Contribution Results (as a % of payroll)** | | | | | |
| Normal contribution | | | | | |
| State | 7.74% | 10.15% | 28.38% | 32.12% | 9.53% |
| Municipal | 8.62% | N/A | N/A | N/A | N/A |
| State unfunded accrued liability payment | 4.76% | 8.61% | 14.07% | 21.11% | 7.24% |
| Total State Contribution | 12.50% | 18.76% | 42.45% | 53.23% | 16.77% |
| * Total State contribution if total costs were reflected (i.e. phase-in for Teachers' Systems) | 12.50% | 19.68% | 42.45% | 53.23% | 17.26% |

TABLE B-2 -- NEW BASIS

MARYLAND RETIREMENT SYSTEMS -- JUNE 30, 1982 SUMMARY OF RESULTS

| | Employees' Retirement & Pension | Teachers' Retirement & Pension | 2 State Police | Judges | TOTAL |
|---|---|---|---|---|---|
| **Membership Data** | | | | | |
| Total Membership | 104,473 | 93,622 | 1,874 | 379 | 200,348 |
| Total Payroll | $1,244,147,000 | $1,478,219,000 | $29,111,000 | $11,179,000 | $2,762,656,000 |
| Total Retirement Allowances | $89,031,000 | $173,574,000 | $5,272,000 | $3,372,000 | $271,249,000 |
| **Assets and Liabilities** | | | | | |
| Assets for valuation purposes | $1,059,500,200 | $1,903,200,200 | $107,153,200 | $4,192,100 | $3,074,045,700 |
| Unfunded accrued liability | | | | | |
| State | $1,356,010,984 | $4,039,125,035 | $112,857,595 | $55,387,383 | $5,563,380,997 |
| Municipal | $343,680,220 | N/A | N/A | N/A | $343,680,220 |
| Transitional liability | | | | | |
| State | $43,888,684 | $297,318,025 | N/A | N/A | $341,206,709 |
| Municipal | $11,123,562 | N/A | N/A | N/A | $11,123,562 |
| **Contribution Results (as a % of payroll)** | | | | | |
| Normal contribution | | | | | |
| State | 6.70% | 7.50% | 25.00% | 36.00% | 7.52% |
| Municipal | 6.50% | N/A | N/A | N/A | N/A |
| State unfunded accrued liability payment | 5.22% | 10.07% | 14.29% | 18.27% | 8.28% |
| State transitional liability payment | 0.28% | 1.25% | N/A | N/A | 0.86% |
| Total State Contribution | 12.20% | 18.82% | 39.29% | 54.27% | 16.66% |

TABLE B-3

Comparison of Results

Old Basis vs. New Basis

Systems Combined

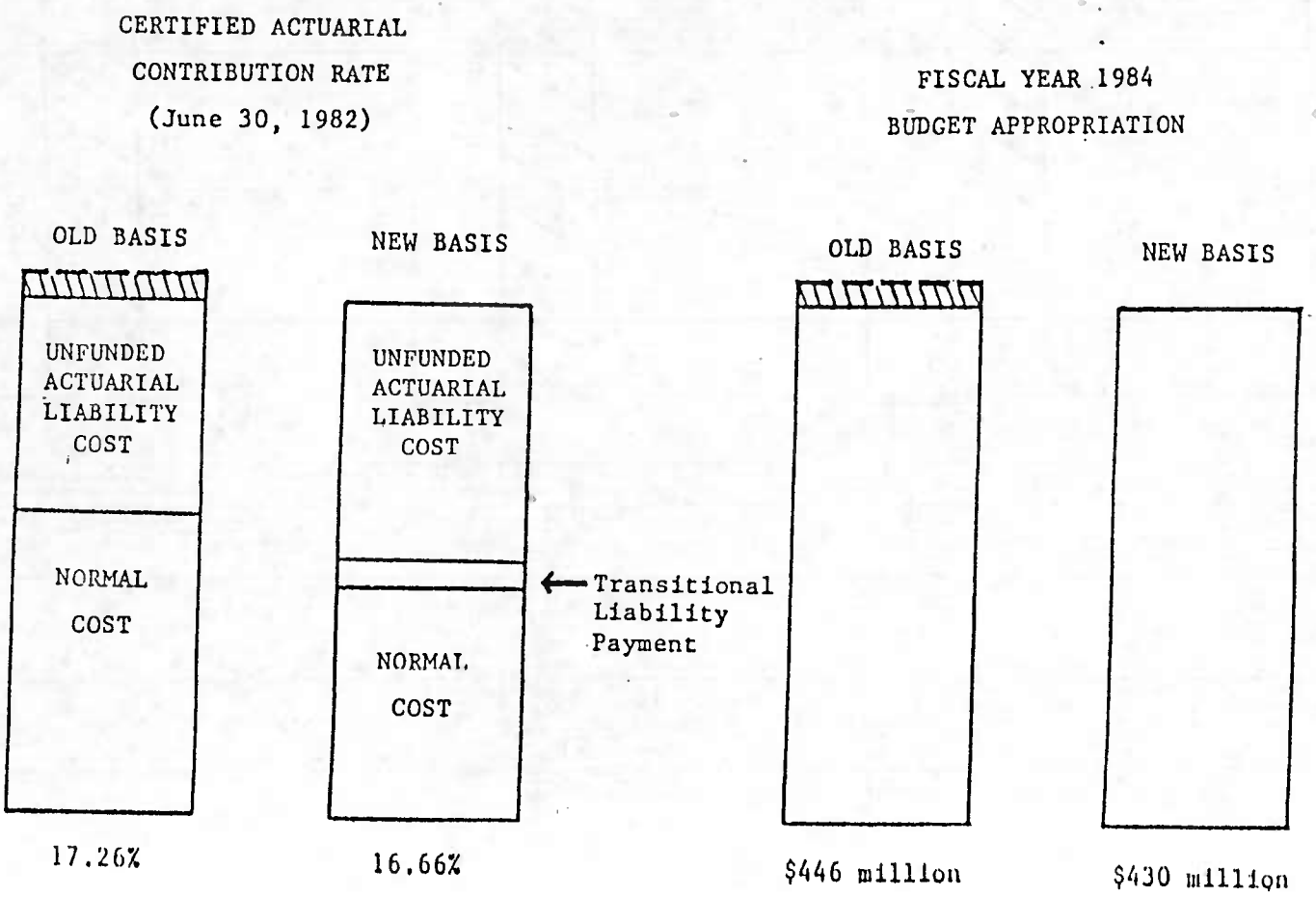
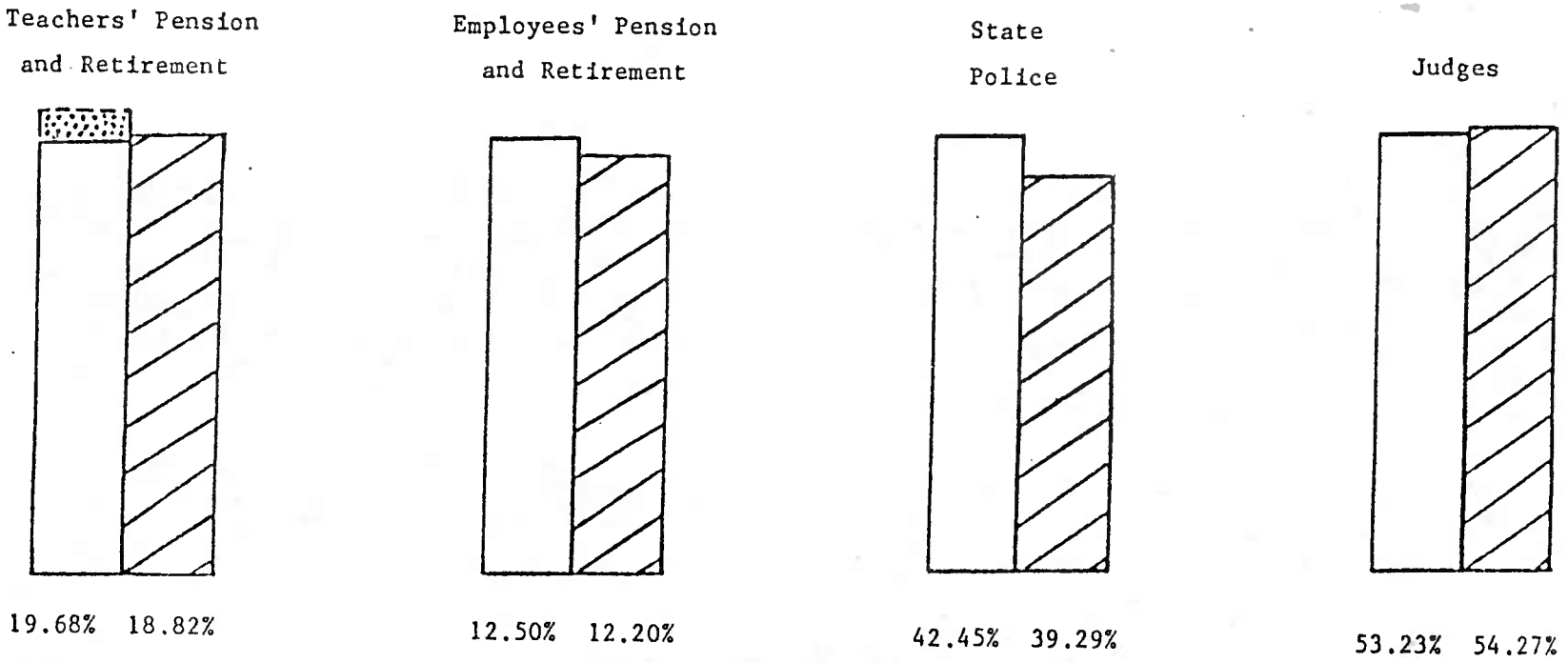


TABLE B-4

COMPARISON OF COST RESULTS BY SYSTEM

OLD BASIS vs. NEW BASIS

(June 30, 1982 Valuation)



## Cost Impact Of Proposed Changes By Recommendation

| Recommendation | on Contribution Rate | on FY1984 Budget |
|---|---|---|
| . Change Funding Method to Entry Age Normal | -.20 | -5.3 million |
| 2. Unify the Retirement and Pension Systems for Funding Purposes Only | 0 | 0 |
| . Change the Valuation Date | 0 | 0 |
| . Alternatives to State/Local Cost Allocations | 0 | 0 |
| 5. Modify Method to Value Plan Asset | -.40 | -10.7 million |
| 6. Anticipate Budget Logs | not calculated | not calculated |
| 7. Improve Disclosure Method | 0 | 0 |
| 8. Unify Reporting of Results | 0 | 0 |
| 9. Involve State Actuaries in Budget Planning | 0 | 0 |
| 0. Total Recommendations | -0.60 | -$16 million |

## APPENDIX C

## COST PROJECTIONS

On the following pages are thirty-six Tables which provide a ten-year cost projection for each system*, based upon the following hypothetical situations

1. All actuarial assumptions are realized

2. Investment earnings average to 8½% during the ten-year period (i.e. 1½% in excess of assumed rate). All other assumptions are realized.

3. Rate of general pay increases and cost of living increases exceed the assumed rate by 1½%. All other assumptions are realized.

4. Investment earnings, general pay increases, and cost of living increases exceed the assumed rate by 1½%. All other assumptions are realized.

5. Varying rates of Membership Transfer from the Retirement Systems to the Pension Systems.

* In order to facilitate comparisons, cost projection on the Teachers' and Employees' Systems combine the results of the Retirement and Pension Systems.

COMPARATIVE TABLE

| TABLE | SYSTEM | Actuarial Procedures | Actual Investment Performance | Actual Salary and C.O.L.A. Experience | Annual Rate of Membership Transfer |
|---|---|---|---|---|---|
| C- 1 | TEACHERS | OLD BASIS | 7.0% | as assumed | none |
| C- 2 | TEACHERS | OLD BASIS | 8.5% | as assumed | none |
| C- 3 | TEACHERS | OLD BASIS | 7.0% | assumed +1.5% | none |
| C- 4 | TEACHERS | OLD BASIS | 8.5% | assumed +1.5% | none |
| C- 5 | TEACHERS | OLD BASIS | 7.0% | as assumed | 0%,5%,and 10% |
| C- 6 | EMPLOYEES | OLD BASIS | 7.0% | as assumed | none |
| C- 7 | EMPLOYEES | OLD BASIS | 8.5% | as assumed | none |
| C- 8 | EMPLOYEES | OLD BASIS | 7.0% | assumed +1.5% | none |
| C- 9 | EMPLOYEES | OLD BASIS | 8.5% | assumed +1.5% | none |
| C- 10 | EMPLOYEES | OLD BASIS | 7.0% | as assumed | 0%,5%,and 10% |
| C- 11 | STATE POLICE | OLD BASIS | 7.0% | as assumed | N/A |
| C- 12 | STATE POLICE | OLD BASIS | 8.5% | as assumed | N/A |
| C- 13 | STATE POLICE | OLD BASIS | 7.0% | assumed +1.5% | N/A |
| C- 14 | STATE POLICE | OLD BASIS | 8.5% | assumed +1.5% | N/A |
| C- 15 | JUDGES | OLD BASIS | 7.0% | as assumed | N/A |
| C- 16 | JUDGES | OLD BASIS | 8.5% | as assumed | N/A |
| C- 17 | JUDGES | OLD BASIS | 7.0% | assumed +1.5% | N/A |
| C- 18 | JUDGES | OLD BASIS | 8.5% | assumed +1.5% | N/A |
| C- 19 | TEACHERS | NEW BASIS | 7.0% | as assumed | none |
| C- 20 | TEACHERS | NEW BASIS | 8.5% | as assumed | none |
| C- 21 | TEACHERS | NEW BASIS | 7.0% | assumed +1.5% | none |
| C- 22 | TEACHERS | NEW BASIS | 8.5% | assumed +1.5% | none |
| C- 23 | TEACHERS | NEW BASIS | 7.0% | as assumed | 0%,5%,and 10% |
| C- 24 | EMPLOYEES | NEW BASIS | 7.0% | as assumed | none |
| C- 25 | EMPLOYEES | NEW BASIS | 8.5% | as assumed | none |
| C- 26 | EMPLOYEES | NEW BASIS | 7.0% | assumed +1.5% | none |
| C- 27 | EMPLOYEES | NEW BASIS | 8.5% | assumed +1.5% | none |
| C- 28 | EMPLOYEES | NEW BASIS | 7.0% | as assumed | 0%,5%,and 10% |
| C- 29 | STATE POLICE | NEW BASIS | 7.0% | as assumed | N/A |
| C- 30 | STATE POLICE | NEW BASIS | 8.5% | as assumed | N/A |
| C- 31 | STATE POLICE | NEW BASIS | 7.0% | assumed +1.5% | N/A |
| C- 32 | STATE POLICE | NEW BASIS | 8.5% | assumed +1.5% | N/A |
| C- 33 | JUDGES | NEW BASIS | 7.0% | as assumed | N/A |
| C- 34 | JUDGES | NEW BASIS | 8.5% | as assumed | N/A |
| C- 35 | JUDGES | NEW BASIS | 7.0% | assumed +1.5% | N/A |
| C- 36 | JUDGES | NEW BASIS | 8.5% | assumed +1.5% | N/A |
| C- 37 | ALL SYSTEMS | OLD VS NEW BAS | 7.0% | as assumed | N/A |
| C- 38 | ALL SYSTEMS | OLD VS NEW BAS | 8.5% | as assumed | N/A |
| C- 39 | ALL SYSTEMS | OLD VS NEW BAS | 7.0% | assumed +1.5% | N/A |
| C- 40 | ALL SYSTEMS | OLD VS NEW BAS | 8.5% | assumed +1.5% | N/A |

(V)

TABLE C-1

THE STATE OF MARYLAND
TEACHERS' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 1478 | 1552 | 1630 | 1711 | 1797 | 1887 | 1981 | 2080 | 2184 | 2293 | 2408 |
| BENEFITS | 173.57 | 187.72 | 203.01 | 219.55 | 237.44 | 256.79 | 277.71 | 300.34 | 324.81 | 351.27 | 379.90 |
| ASSETS | 1730 | 1973 | 2243 | 2545 | 2881 | 3256 | 3675 | 4142 | 4664 | 5247 | 5898 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 243.38 | 239.17 | 234.88 | 230.50 | 226.03 | 221.46 | 216.80 | 212.04 | 207.17 | 202.21 | 197.14 |
| - in dollars | 3598 | 3712 | 3828 | 3944 | 4061 | 4178 | 4295 | 4410 | 4525 | 4637 | 4747 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 19.68 | 20.33 | 21.03 | 21.77 | 22.56 | 23.39 | 24.28 | 25.22 | 26.22 | 27.29 | 28.42 |
| -dollars | 290.86 | 315.59 | 342.73 | 372.53 | 405.28 | 441.30 | 480.94 | 524.58 | 572.68 | 625.70 | 684.21 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 5.00%

TABLE C-2

THE STATE OF MARYLAND
TEACHERS' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 1478 | 1552 | 1630 | 1711 | 1797 | 1887 | 1981 | 2080 | 2184 | 2293 | 2408 |
| BENEFITS | 173.57 | 187.72 | 203.01 | 219.55 | 237.44 | 256.79 | 277.71 | 300.34 | 324.81 | 351.27 | 379.90 |
| ASSETS | 1730 | 1999 | 2302 | 2640 | 3020 | 3446 | 3923 | 4457 | 5056 | 5726 | 6476 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 243.38 | 237.45 | 231.29 | 224.90 | 218.27 | 211.40 | 204.27 | 196.89 | 189.24 | 181.33 | 173.14 |
| - in dollars | 3598 | 3685 | 3769 | 3849 | 3922 | 3988 | 4047 | 4095 | 4133 | 4158 | 4169 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 19.68 | 20.27 | 20.89 | 21.55 | 22.25 | 22.98 | 23.76 | 24.57 | 25.44 | 26.35 | 27.31 |
| -dollars | 290.86 | 314.58 | 340.49 | 368.79 | 399.73 | 433.57 | 470.61 | 511.16 | 555.58 | 604.27 | 657.64 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 5.00%

TABLE C-3

THE STATE OF MARYLAND
TEACHERS' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 1478 | 1552 | 1630 | 1711 | 1797 | 1887 | 1981 | 2080 | 2184 | 2293 | 2408 |
| BENEFITS | 173.57 | 190.40 | 208.85 | 229.10 | 251.30 | 275.66 | 302.38 | 331.69 | 363.84 | 399.11 | 437.79 |
| ASSETS | 1730 | 1973 | 2243 | 2546 | 2883 | 3260 | 3681 | 4151 | 4676 | 5262 | 5918 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 243.38 | 244.41 | 245.42 | 246.40 | 247.37 | 248.30 | 249.20 | 250.06 | 250.87 | 251.64 | 252.35 |
| - in dollars | 3598 | 3794 | 4000 | 4217 | 4445 | 4684 | 4936 | 5201 | 5479 | 5771 | 6076 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 19.68 | 20.53 | 21.43 | 22.39 | 23.41 | 24.48 | 25.63 | 26.84 | 28.13 | 29.50 | 30.95 |
| -dollars | 290.86 | 318.64 | 349.30 | 383.15 | 420.56 | 461.91 | 507.65 | 558.28 | 614.34 | 676.45 | 745.32 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase-------- 6.50%

TABLE C-4

THE STATE OF MARYLAND
TEACHERS' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 1478 | 1552 | 1630 | 1711 | 1797 | 1887 | 1981 | 2080 | 2184 | 2293 | 2408 |
| BENEFITS | 173.57 | 190.40 | 208.85 | 229.10 | 251.30 | 275.66 | 302.38 | 331.69 | 363.84 | 399.11 | 437.79 |
| ASSETS | 1730 | 1999 | 2302 | 2642 | 3023 | 3450 | 3929 | 4466 | 5068 | 5742 | 6496 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 243.38 | 242.68 | 241.82 | 240.80 | 239.61 | 238.23 | 236.66 | 234.90 | 232.92 | 230.73 | 228.31 |
| - in dollars | 3598 | 3767 | 3941 | 4121 | 4305 | 4495 | 4688 | 4886 | 5087 | 5291 | 5497 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 19.68 | 20.46 | 21.30 | 22.17 | 23.10 | 24.07 | 25.10 | 26.19 | 27.35 | 28.56 | 29.85 |
| -dollars | 290.86 | 317.63 | 347.06 | 379.41 | 415.01 | 454.18 | 497.32 | 544.84 | 597.22 | 654.99 | 718.71 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 6.50%

TABLE C-3

THE STATE OF MARYLAND
COMBINED TEACHERS' SYSTEMS
COST PROJECTIONS
EFFECT OF MEMBERSHIP TRANSFERS
(dollars in millions)

OLD BASIS

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ANNUAL TRANSFER RATE ------- | 0.00% (all other assumptions as assumed) | | | | | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 19.68 | 20.33 | 21.03 | 21.77 | 22.56 | 23.39 | 24.28 | 25.22 | 26.22 | 27.28 | 28.42 |
| -dollars | 290.86 | 315.58 | 342.76 | 372.54 | 405.27 | 441.36 | 480.92 | 524.66 | 572.68 | 625.60 | 684.27 |
| ANNUAL TRANSFER RATE ------- | 5.00% (all other assumptions as assumed) | | | | | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 19.68 | 19.54 | 19.44 | 19.38 | 19.34 | 19.33 | 19.32 | 19.31 | 19.30 | 19.29 | 19.28 |
| -dollars | 290.86 | 303.32 | 316.88 | 331.55 | 347.53 | 364.72 | 382.76 | 401.69 | 421.56 | 442.40 | 464.28 |
| ANNUAL TRANSFER RATE ------- | 10.00% (all other assumptions as assumed) | | | | | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 19.68 | 18.83 | 18.10 | 17.48 | 16.97 | 16.57 | 16.27 | 16.10 | 16.04 | 16.02 | 16.01 |
| -dollars | 290.86 | 292.29 | 295.02 | 299.12 | 304.87 | 312.60 | 322.38 | 334.90 | 350.28 | 367.34 | 385.46 |

TABLE C-6

THE STATE OF MARYLAND
EMPLOYEES' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 957 | 1005 | 1055 | 1108 | 1163 | 1222 | 1283 | 1347 | 1414 | 1485 | 1559 |
| BENEFITS | 89.03 | 96.28 | 104.11 | 112.59 | 121.75 | 131.66 | 142.37 | 153.96 | 166.49 | 180.05 | 194.70 |
| ASSETS | 963 | 1062 | 1171 | 1289 | 1419 | 1561 | 1717 | 1888 | 2075 | 2281 | 2506 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 128.97 | 126.74 | 124.47 | 122.15 | 119.78 | 117.36 | 114.88 | 112.36 | 109.79 | 107.16 | 104.47 |
| - in dollars | 1234 | 1274 | 1313 | 1353 | 1394 | 1434 | 1474 | 1513 | 1553 | 1591 | 1629 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.50 | 12.85 | 13.22 | 13.62 | 14.03 | 14.46 | 14.91 | 15.39 | 15.89 | 16.42 | 16.98 |
| -dollars | 119.60 | 129.15 | 139.54 | 150.86 | 163.19 | 176.63 | 191.30 | 207.29 | 224.76 | 243.83 | 264.68 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 5.00%

TABLE C-7

THE STATE OF MARYLAND
EMPLOYEES' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 957 | 1005 | 1055 | 1108 | 1163 | 1222 | 1283 | 1347 | 1414 | 1485 | 1559 |
| BENEFITS | 89.03 | 96.28 | 104.11 | 112.59 | 121.75 | 131.66 | 142.37 | 153.96 | 166.49 | 180.05 | 194.70 |
| ASSETS | 963 | 1077 | 1202 | 1340 | 1492 | 1659 | 1842 | 2044 | 2267 | 2511 | 2781 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 128.97 | 125.28 | 121.48 | 117.57 | 113.53 | 109.39 | 105.12 | 100.74 | 96.23 | 91.62 | 86.88 |
| - in dollars | 1234 | 1259 | 1282 | 1303 | 1321 | 1336 | 1348 | 1357 | 1361 | 1360 | 1355 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.50 | 12.80 | 13.11 | 13.44 | 13.78 | 14.13 | 14.51 | 14.90 | 15.30 | 15.73 | 16.17 |
| -dollars | 119.60 | 128.60 | 138.34 | 148.88 | 160.30 | 172.67 | 186.08 | 200.62 | 216.39 | 233.50 | 252.07 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 5.00%

TABLE C-8

THE STATE OF MARYLAND
EMPLOYEES' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 957 | 1005 | 1055 | 1108 | 1163 | 1222 | 1283 | 1347 | 1414 | 1485 | 1559 |
| BENEFITS | 89.03 | 97.65 | 107.11 | 117.48 | 128.86 | 141.33 | 155.02 | 170.03 | 186.50 | 204.56 | 224.38 |
| ASSETS | 963 | 1062 | 1170 | 1289 | 1418 | 1559 | 1714 | 1882 | 2067 | 2268 | 2489 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 128.97 | 130.06 | 131.14 | 132.19 | 133.22 | 134.22 | 135.17 | 136.09 | 136.96 | 137.77 | 138.52 |
| - in dollars | 1234 | 1307 | 1384 | 1465 | 1550 | 1640 | 1734 | 1833 | 1937 | 2046 | 2160 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.50 | 12.98 | 13.48 | 14.01 | 14.56 | 15.15 | 15.76 | 16.40 | 17.08 | 17.79 | 18.54 |
| -dollars | 119.60 | 130.40 | 142.24 | 155.21 | 169.43 | 185.02 | 202.13 | 220.91 | 241.53 | 264.18 | 289.08 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 6.50%

TABLE C-9

THE STATE OF MARYLAND
EMPLOYEES' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 957 | 1005 | 1055 | 1108 | 1163 | 1222 | 1283 | 1347 | 1414 | 1485 | 1559 |
| BENEFITS | 89.03 | 97.65 | 107.11 | 117.48 | 128.86 | 141.33 | 155.02 | 170.03 | 186.50 | 204.56 | 224.38 |
| ASSETS | 963 | 1077 | 1202 | 1339 | 1491 | 1657 | 1839 | 2039 | 2258 | 2499 | 2762 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 128.97 | 128.60 | 128.15 | 127.61 | 126.98 | 126.25 | 125.42 | 124.48 | 123.43 | 122.26 | 120.97 |
| - in dollars | 1234 | 1293 | 1352 | 1414 | 1477 | 1542 | 1609 | 1677 | 1745 | 1815 | 1886 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.50 | 12.92 | 13.36 | 13.83 | 14.31 | 14.82 | 15.35 | 15.91 | 16.49 | 17.10 | 17.73 |
| -dollars | 119.60 | 129.85 | 141.03 | 153.23 | 166.53 | 181.06 | 196.92 | 214.25 | 233.18 | 253.87 | 276.50 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 6.50%

TABLE C-10

THE STATE OF MARYLAND
COMBINED EMPLOYEES' SYSTEMS
COST PROJECTIONS
EFFECT OF MEMBERSHIP TRANSFERS
(dollars in millions)

OLD BASIS

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ANNUAL TRANSFER RATE ------- | | | 0.00% | (all other assumptions as assumed) | | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.20 | 12.85 | 13.22 | 13.61 | 14.03 | 14.46 | 14.92 | 15.39 | 15.89 | 16.42 | 16.98 |
| -dollars | 116.76 | 129.17 | 139.55 | 150.82 | 163.22 | 176.61 | 191.33 | 207.28 | 224.78 | 243.82 | 264.68 |
| ANNUAL TRANSFER RATE ------- | | | 5.00% | (all other assumptions as assumed) | | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.20 | 12.46 | 12.45 | 12.46 | 12.49 | 12.54 | 12.62 | 12.72 | 12.85 | 13.00 | 13.18 |
| -dollars | 116.76 | 125.26 | 131.39 | 138.01 | 145.36 | 153.23 | 161.94 | 171.37 | 181.73 | 193.01 | 205.47 |
| ANNUAL TRANSFER RATE ------- | | | 10.00% | (all other assumptions as assumed) | | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.20 | 12.12 | 11.82 | 11.60 | 11.47 | 11.42 | 11.34 | 11.27 | 11.21 | 11.15 | 11.10 |
| -dollars | 116.76 | 121.82 | 124.77 | 128.57 | 133.51 | 139.49 | 145.44 | 151.77 | 158.51 | 165.54 | 173.04 |

TABLE C-11

THE STATE OF MARYLAND
STATE POLICE RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 29.11 | 30.57 | 32.09 | 33.70 | 35.38 | 37.15 | 39.01 | 40.96 | 43.01 | 45.16 | 47.42 |
| BENEFITS | 5.29 | 5.84 | 6.43 | 7.09 | 7.82 | 8.62 | 9.51 | 10.48 | 11.56 | 12.74 | 14.05 |
| ASSETS | 97.41 | 111.54 | 126.87 | 143.48 | 161.45 | 180.85 | 201.77 | 224.29 | 248.50 | 274.47 | 302.30 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 381.59 | 375.00 | 368.27 | 361.40 | 354.39 | 347.22 | 339.91 | 332.45 | 324.83 | 317.05 | 309.10 |
| - in dollars | 111.08 | 114.62 | 118.20 | 121.79 | 125.40 | 129.01 | 132.61 | 136.18 | 139.71 | 143.18 | 146.57 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 42.45 | 42.89 | 43.33 | 43.78 | 44.24 | 44.71 | 45.18 | 45.66 | 46.15 | 46.64 | 47.15 |
| -dollars | 12.36 | 13.11 | 13.91 | 14.76 | 15.66 | 16.61 | 17.63 | 18.70 | 19.85 | 21.06 | 22.36 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 5.00%

TABLE C-12

THE STATE OF MARYLAND
STATE POLICE RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 29.11 | 30.57 | 32.09 | 33.70 | 35.38 | 37.15 | 39.01 | 40.96 | 43.01 | 45.16 | 47.42 |
| BENEFITS | 5.29 | 5.84 | 6.43 | 7.09 | 7.82 | 8.62 | 9.51 | 10.48 | 11.56 | 12.74 | 14.05 |
| ASSETS | 97.41 | 113.05 | 130.17 | 148.89 | 169.31 | 191.53 | 215.68 | 241.87 | 270.21 | 300.83 | 333.84 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 381.59 | 370.05 | 357.97 | 345.34 | 332.17 | 318.48 | 304.27 | 289.55 | 274.35 | 258.69 | 242.58 |
| - in dollars | 111.08 | 113.11 | 114.89 | 116.38 | 117.54 | 118.33 | 118.70 | 118.61 | 118.00 | 116.83 | 115.03 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 42.45 | 42.70 | 42.94 | 43.16 | 43.36 | 43.54 | 43.70 | 43.83 | 43.95 | 44.03 | 44.09 |
| -dollars | 12.36 | 13.05 | 13.78 | 14.54 | 15.34 | 16.18 | 17.05 | 17.96 | 18.90 | 19.88 | 20.91 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 5.00%

TABLE C-13

THE STATE OF MARYLAND
STATE POLICE RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 29.11 | 30.57 | 32.09 | 33.70 | 35.38 | 37.15 | 39.01 | 40.96 | 43.01 | 45.16 | 47.42 |
| BENEFITS | 5.29 | 5.92 | 6.62 | 7.40 | 8.28 | 9.26 | 10.35 | 11.58 | 12.94 | 14.48 | 16.19 |
| ASSETS | 97.41 | 111.54 | 126.91 | 143.60 | 161.70 | 181.29 | 202.46 | 225.29 | 249.87 | 276.29 | 304.63 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 381.59 | 385.57 | 389.71 | 393.99 | 398.39 | 402.89 | 407.45 | 412.05 | 416.66 | 421.23 | 425.71 |
| - in dollars | 111.08 | 117.86 | 125.08 | 132.77 | 140.97 | 149.69 | 158.95 | 168.79 | 179.21 | 190.23 | 201.87 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 42.45 | 43.28 | 44.15 | 45.06 | 46.00 | 46.97 | 47.99 | 49.05 | 50.16 | 51.31 | 52.51 |
| -dollars | 12.36 | 13.23 | 14.17 | 15.18 | 16.28 | 17.45 | 18.72 | 20.09 | 21.57 | 23.17 | 24.90 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 6.50%

TABLE C-14

THE STATE OF MARYLAND
STATE POLICE RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 29.11 | 30.57 | 32.09 | 33.70 | 35.38 | 37.15 | 39.01 | 40.96 | 43.01 | 45.16 | 47.42 |
| BENEFITS | 5.29 | 5.92 | 6.62 | 7.40 | 8.28 | 9.26 | 10.35 | 11.58 | 12.94 | 14.48 | 16.19 |
| ASSETS | 97.41 | 113.05 | 130.21 | 149.02 | 169.57 | 191.98 | 216.39 | 242.89 | 271.63 | 302.72 | 336.28 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 381.59 | 380.62 | 379.40 | 377.92 | 376.16 | 374.11 | 371.76 | 369.08 | 366.07 | 362.71 | 358.97 |
| - in dollars | 111.08 | 116.34 | 121.77 | 127.36 | 133.10 | 139.00 | 145.03 | 151.18 | 157.45 | 163.80 | 170.22 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 42.45 | 43.10 | 43.76 | 44.43 | 45.11 | 45.80 | 46.51 | 47.22 | 47.95 | 48.69 | 49.44 |
| -dollars | 12.36 | 13.17 | 14.04 | 14.97 | 15.96 | 17.02 | 18.14 | 19.34 | 20.62 | 21.99 | 23.44 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 6.50%

TABLE C-15

THE STATE OF MARYLAND
JUDGES AND THEIR SURVIVING SPOUSES
RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 11.18 | 11.74 | 12.33 | 12.94 | 13.59 | 14.27 | 14.98 | 15.73 | 16.52 | 17.34 | 18.21 |
| BENEFITS | 3.37 | 3.72 | 4.10 | 4.52 | 4.98 | 5.49 | 6.05 | 6.68 | 7.36 | 8.11 | 8.95 |
| ASSETS | 3.81 | 6.75 | 9.96 | 13.45 | 17.25 | 21.37 | 25.81 | 30.59 | 35.71 | 41.18 | 47.01 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 572.55 | 562.66 | 552.56 | 542.25 | 531.73 | 520.99 | 510.02 | 498.81 | 487.38 | 475.70 | 463.78 |
| - in dollars | 64.01 | 66.05 | 68.11 | 70.18 | 72.26 | 74.33 | 76.41 | 78.47 | 80.50 | 82.50 | 84.46 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 53.23 | 54.21 | 55.22 | 56.27 | 57.34 | 58.44 | 59.58 | 60.76 | 61.96 | 63.21 | 64.49 |
| -dollars | 5.95 | 6.36 | 6.81 | 7.28 | 7.79 | 8.34 | 8.93 | 9.56 | 10.23 | 10.96 | 11.74 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 5.00%

TABLE C-16

THE STATE OF MARYLAND
JUDGES AND THEIR SURVIVING SPOUSES
RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 11.18 | 11.74 | 12.33 | 12.94 | 13.59 | 14.27 | 14.98 | 15.73 | 16.52 | 17.34 | 18.21 |
| BENEFITS | 3.37 | 3.72 | 4.10 | 4.52 | 4.98 | 5.49 | 6.05 | 6.68 | 7.36 | 8.11 | 8.95 |
| ASSETS | 3.81 | 6.82 | 10.15 | 13.83 | 17.87 | 22.29 | 27.11 | 32.35 | 38.02 | 44.14 | 50.72 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 572.55 | 562.01 | 550.94 | 539.34 | 527.20 | 514.52 | 501.32 | 487.60 | 473.36 | 458.62 | 443.38 |
| - in dollars | 64.01 | 65.97 | 67.91 | 69.80 | 71.64 | 73.41 | 75.11 | 76.70 | 78.19 | 79.54 | 80.74 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 53.23 | 54.19 | 55.16 | 56.15 | 57.16 | 58.18 | 59.22 | 60.28 | 61.35 | 62.44 | 63.55 |
| -dollars | 5.95 | 6.36 | 6.80 | 7.27 | 7.77 | 8.30 | 8.87 | 9.48 | 10.13 | 10.83 | 11.57 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 5.00%

TABLE C-17

THE STATE OF MARYLAND
JUDGES AND THEIR SURVIVING SPOUSES
RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 11.18 | 11.74 | 12.33 | 12.94 | 13.59 | 14.27 | 14.98 | 15.73 | 16.52 | 17.34 | 18.21 |
| BENEFITS | 3.37 | 3.77 | 4.22 | 4.71 | 5.27 | 5.90 | 6.59 | 7.37 | 8.24 | 9.22 | 10.31 |
| ASSETS | 3.81 | 6.75 | 9.94 | 13.40 | 17.14 | 21.15 | 25.43 | 29.98 | 34.78 | 39.83 | 45.08 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 572.55 | 571.52 | 570.43 | 569.27 | 568.00 | 566.59 | 565.00 | 563.21 | 561.17 | 558.83 | 556.15 |
| - in dollars | 64.01 | 67.09 | 70.31 | 73.67 | 77.18 | 80.84 | 84.65 | 88.60 | 92.69 | 96.92 | 101.28 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 53.23 | 54.54 | 55.91 | 57.32 | 58.78 | 60.30 | 61.87 | 63.50 | 65.18 | 66.93 | 68.73 |
| -dollars | 5.95 | 6.40 | 6.89 | 7.42 | 7.99 | 8.60 | 9.27 | 9.99 | 10.77 | 11.61 | 12.52 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase------- 6.50%

TABLE C-18

THE STATE OF MARYLAND
JUDGES AND THEIR SURVIVING SPOUSES
RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 11.18 | 11.74 | 12.33 | 12.94 | 13.59 | 14.27 | 14.98 | 15.73 | 16.52 | 17.34 | 18.21 |
| BENEFITS | 3.37 | 3.77 | 4.22 | 4.71 | 5.27 | 5.90 | 6.59 | 7.37 | 8.24 | 9.22 | 10.31 |
| ASSETS | 3.81 | 6.82 | 10.14 | 13.78 | 17.75 | 22.06 | 26.72 | 31.72 | 37.07 | 42.74 | 48.73 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 572.55 | 570.87 | 568.81 | 566.36 | 563.48 | 560.15 | 556.37 | 552.10 | 547.32 | 542.01 | 536.13 |
| - in dollars | 64.01 | 67.01 | 70.11 | 73.30 | 76.57 | 79.92 | 83.35 | 86.85 | 90.40 | 94.00 | 97.63 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 53.23 | 54.52 | 55.85 | 57.21 | 58.60 | 60.04 | 61.51 | 63.03 | 64.58 | 66.18 | 67.81 |
| -dollars | 5.95 | 6.40 | 6.88 | 7.40 | 7.96 | 8.57 | 9.22 | 9.91 | 10.67 | 11.48 | 12.35 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- Old Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 6.50%

TABLE C-19

THE STATE OF MARYLAND
TEACHERS' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 1478 | 1552 | 1630 | 1711 | 1797 | 1887 | 1981 | 2080 | 2184 | 2293 | 2408 |
| BENEFITS | 173.57 | 187.72 | 203.01 | 219.55 | 237.44 | 256.79 | 277.71 | 300.34 | 324.81 | 351.27 | 379.90 |
| ASSETS | 1903 | 2126 | 2363 | 2614 | 2882 | 3165 | 3465 | 3782 | 4115 | 4466 | 4835 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 273.24 | 268.52 | 263.70 | 258.79 | 253.76 | 248.64 | 243.40 | 238.05 | 232.60 | 227.02 | 221.34 |
| - in dollars | 4039 | 4168 | 4298 | 4428 | 4560 | 4691 | 4822 | 4952 | 5080 | 5206 | 5329 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 18.82 | 18.83 | 18.84 | 18.85 | 18.86 | 18.88 | 18.89 | 18.90 | 18.92 | 18.93 | 18.95 |
| -dollars | 278.13 | 292.21 | 307.01 | 322.57 | 338.93 | 356.12 | 374.19 | 393.18 | 413.16 | 434.16 | 456.24 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 5.00%

TABLE C-20

THE STATE OF MARYLAND
TEACHERS' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 1478 | 1552 | 1630 | 1711 | 1797 | 1887 | 1981 | 2080 | 2184 | 2293 | 2408 |
| BENEFITS | 173.57 | 187.72 | 203.01 | 219.55 | 237.44 | 256.79 | 277.71 | 300.34 | 324.81 | 351.27 | 379.90 |
| ASSETS | 1903 | 2155 | 2426 | 2716 | 3028 | 3362 | 3718 | 4098 | 4501 | 4930 | 5383 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 273.24 | 266.64 | 259.84 | 252.83 | 245.63 | 238.23 | 230.64 | 222.87 | 214.93 | 206.82 | 198.56 |
| - in dollars | 4039 | 4139 | 4235 | 4327 | 4413 | 4494 | 4569 | 4636 | 4694 | 4743 | 4781 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 18.82 | 18.76 | 18.69 | 18.62 | 18.54 | 18.45 | 18.36 | 18.26 | 18.15 | 18.03 | 17.90 |
| -dollars | 278.13 | 291.11 | 304.60 | 318.59 | 333.10 | 348.12 | 363.66 | 379.73 | 396.32 | 413.42 | 431.03 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 5.00%

TABLE C-21

THE STATE OF MARYLAND
TEACHERS' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 1478 | 1552 | 1630 | 1711 | 1797 | 1887 | 1981 | 2080 | 2184 | 2293 | 2408 |
| BENEFITS | 173.57 | 190.40 | 208.85 | 229.10 | 251.30 | 275.66 | 302.38 | 331.69 | 363.84 | 399.11 | 437.79 |
| ASSETS | 1903 | 2126 | 2363 | 2617 | 2886 | 3173 | 3477 | 3799 | 4138 | 4496 | 4872 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 273.24 | 274.32 | 275.31 | 276.22 | 277.03 | 277.71 | 278.25 | 278.64 | 278.85 | 278.85 | 278.64 |
| - in dollars | 4039 | 4258 | 4487 | 4727 | 4978 | 5239 | 5512 | 5796 | 6090 | 6395 | 6709 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 18.82 | 19.06 | 19.32 | 19.59 | 19.87 | 20.16 | 20.46 | 20.77 | 21.10 | 21.44 | 21.79 |
| -dollars | 278.13 | 295.88 | 314.87 | 335.21 | 356.98 | 380.30 | 405.30 | 432.09 | 460.83 | 491.65 | 524.75 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 6.50%

TABLE C-22

THE STATE OF MARYLAND
TEACHERS' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 1478 | 1552 | 1630 | 1711 | 1797 | 1887 | 1981 | 2080 | 2184 | 2293 | 2408 |
| BENEFITS | 173.57 | 190.40 | 208.85 | 229.10 | 251.30 | 275.66 | 302.38 | 331.69 | 363.84 | 399.11 | 437.79 |
| ASSETS | 1903 | 2155 | 2426 | 2719 | 3033 | 3370 | 3730 | 4115 | 4525 | 4961 | 5422 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 273.24 | 272.44 | 271.45 | 270.27 | 268.88 | 267.29 | 265.47 | 263.43 | 261.14 | 258.60 | 255.79 |
| - in dollars | 4039 | 4229 | 4424 | 4625 | 4831 | 5043 | 5259 | 5479 | 5703 | 5930 | 6159 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 18.82 | 18.99 | 19.17 | 19.36 | 19.54 | 19.73 | 19.93 | 20.13 | 20.33 | 20.53 | 20.74 |
| -dollars | 278.13 | 294.78 | 312.46 | 331.23 | 351.15 | 372.30 | 394.76 | 418.61 | 443.95 | 470.86 | 499.45 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 6.50%

TABLE C-23

THE STATE OF MARYLAND
COMBINED TEACHERS' SYSTEMS
COST PROJECTIONS
EFFECT OF MEMBERSHIP TRANSFERS
(dollars in millions)

NEW BASIS

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| ANNUAL TRANSFER RATE ------- | | | 0.00% | | (all other assumptions as assumed) | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 18.82 | 18.83 | 18.84 | 18.85 | 18.86 | 18.88 | 18.89 | 18.90 | 18.92 | 18.93 | 18.95 |
| -dollars | 278.13 | 292.21 | 307.01 | 322.57 | 338.93 | 356.12 | 374.19 | 393.18 | 413.16 | 434.16 | 456.24 |
| ANNUAL TRANSFER RATE ------- | | | 5.00% | | (all other assumptions as assumed) | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 18.82 | 18.15 | 17.52 | 16.94 | 16.39 | 15.89 | 15.42 | 14.98 | 14.59 | 14.22 | 13.89 |
| -dollars | 278.13 | 281.66 | 285.55 | 289.83 | 294.53 | 299.70 | 305.39 | 311.65 | 318.54 | 326.12 | 334.47 |
| ANNUAL TRANSFER RATE ------- | | | 10.00% | | (all other assumptions as assumed) | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 18.82 | 17.54 | 16.42 | 15.45 | 14.62 | 13.92 | 13.35 | 12.89 | 12.56 | 12.33 | 12.22 |
| -dollars | 278.13 | 272.23 | 267.63 | 264.41 | 262.70 | 262.64 | 264.40 | 268.18 | 274.22 | 282.79 | 294.21 |

TABLE C-24

THE STATE OF MARYLAND
EMPLOYEES' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 957 | 1005 | 1055 | 1108 | 1163 | 1222 | 1283 | 1347 | 1414 | 1485 | 1559 |
| BENEFITS | 89.03 | 96.28 | 104.11 | 112.59 | 121.75 | 131.66 | 142.37 | 153.96 | 166.49 | 180.05 | 194.70 |
| ASSETS | 1060 | 1160 | 1265 | 1376 | 1493 | 1615 | 1743 | 1876 | 2015 | 2158 | 2307 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 141.67 | 139.22 | 136.72 | 134.17 | 131.57 | 128.91 | 126.20 | 123.42 | 120.59 | 117.71 | 114.76 |
| - in dollars | 1356 | 1399 | 1443 | 1487 | 1531 | 1575 | 1619 | 1662 | 1705 | 1748 | 1789 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.20 | 12.21 | 12.21 | 12.22 | 12.22 | 12.23 | 12.23 | 12.24 | 12.25 | 12.25 | 12.26 |
| -dollars | 116.78 | 122.67 | 128.86 | 135.37 | 142.20 | 149.39 | 156.93 | 164.86 | 173.20 | 181.95 | 191.16 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 5.00%

TABLE C-25

THE STATE OF MARYLAND
EMPLOYEES' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 957 | 1005 | 1055 | 1108 | 1163 | 1222 | 1283 | 1347 | 1414 | 1485 | 1559 |
| BENEFITS | 89.03 | 96.28 | 104.11 | 112.59 | 121.75 | 131.66 | 142.37 | 153.96 | 166.49 | 180.05 | 194.70 |
| ASSETS | 1060 | 1176 | 1299 | 1431 | 1571 | 1719 | 1876 | 2041 | 2214 | 2396 | 2586 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 141.67 | 137.62 | 133.47 | 129.20 | 124.84 | 120.38 | 115.83 | 111.19 | 106.48 | 101.69 | 96.85 |
| - in dollars | 1356 | 1383 | 1408 | 1432 | 1452 | 1471 | 1486 | 1498 | 1506 | 1510 | 1510 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.20 | 12.15 | 12.09 | 12.02 | 11.95 | 11.88 | 11.80 | 11.72 | 11.63 | 11.54 | 11.44 |
| -dollars | 116.78 | 122.07 | 127.55 | 133.22 | 139.08 | 145.14 | 151.40 | 157.84 | 164.48 | 171.31 | 178.32 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 5.00%

TABLE C-26

THE STATE OF MARYLAND
EMPLOYEES' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 957 | 1005 | 1055 | 1108 | 1163 | 1222 | 1283 | 1347 | 1414 | 1485 | 1559 |
| BENEFITS | 89.03 | 97.65 | 107.11 | 117.48 | 128.86 | 141.33 | 155.02 | 170.03 | 186.50 | 204.56 | 224.38 |
| ASSETS | 1060 | 1160 | 1265 | 1376 | 1493 | 1614 | 1742 | 1874 | 2011 | 2152 | 2297 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 141.67 | 142.86 | 144.01 | 145.12 | 146.17 | 147.15 | 148.05 | 148.85 | 149.55 | 150.12 | 150.55 |
| - in dollars | 1356 | 1436 | 1520 | 1608 | 1701 | 1798 | 1899 | 2005 | 2115 | 2229 | 2347 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.20 | 12.35 | 12.50 | 12.66 | 12.82 | 12.99 | 13.17 | 13.36 | 13.55 | 13.75 | 13.95 |
| -dollars | 116.78 | 124.09 | 131.90 | 140.25 | 149.18 | 158.73 | 168.95 | 179.89 | 191.60 | 204.14 | 217.57 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 6.50%

TABLE C-27

THE STATE OF MARYLAND
EMPLOYEES' COMBINED SYSTEMS
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 957 | 1005 | 1055 | 1108 | 1163 | 1222 | 1283 | 1347 | 1414 | 1485 | 1559 |
| BENEFITS | 89.03 | 97.65 | 107.11 | 117.48 | 128.86 | 141.33 | 155.02 | 170.03 | 186.50 | 204.56 | 224.38 |
| ASSETS | 1060 | 1176 | 1299 | 1431 | 1571 | 1719 | 1874 | 2038 | 2210 | 2389 | 2576 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 141.67 | 141.26 | 140.75 | 140.15 | 139.44 | 138.62 | 137.68 | 136.62 | 135.44 | 134.12 | 132.66 |
| - in dollars | 1356 | 1420 | 1485 | 1553 | 1622 | 1693 | 1766 | 1840 | 1915 | 1992 | 2068 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.20 | 12.29 | 12.37 | 12.46 | 12.55 | 12.65 | 12.74 | 12.84 | 12.93 | 13.03 | 13.13 |
| -dollars | 116.78 | 123.48 | 130.58 | 138.10 | 146.06 | 154.49 | 163.41 | 172.87 | 182.89 | 193.50 | 204.74 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 3.50%

TABLE C-28

THE STATE OF MARYLAND
COMBINED EMPLOYEES' SYSTEMS
COST PROJECTIONS
EFFECT OF MEMBERSHIP TRANSFERS
(dollars in millions)

NEW BASIS

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| ANNUAL TRANSFER RATE ------- | | | 0.00% | | (all other assumptions as assumed) | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.20 | 12.20 | 12.21 | 12.21 | 12.22 | 12.23 | 12.23 | 12.24 | 12.24 | 12.25 | 12.26 |
| -dollars | 116.76 | 122.65 | 128.83 | 135.33 | 142.16 | 149.39 | 156.93 | 164.84 | 173.16 | 181.89 | 191.15 |
| ANNUAL TRANSFER RATE ------- | | | 5.00% | | (all other assumptions as assumed) | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.20 | 11.93 | 11.69 | 11.48 | 11.29 | 11.14 | 11.01 | 10.90 | 10.82 | 10.76 | 10.73 |
| -dollars | 116.76 | 119.91 | 123.37 | 127.19 | 131.39 | 136.07 | 141.17 | 146.79 | 152.97 | 159.79 | 167.35 |
| ANNUAL TRANSFER RATE ------- | | | 10.00% | | (all other assumptions as assumed) | | | | | | |
| COMBINED SYSTEM CONTRIBUTION | | | | | | | | | | | |
| -rate | 12.20 | 11.70 | 11.30 | 11.01 | 10.81 | 10.72 | 10.64 | 10.57 | 10.51 | 10.45 | 10.40 |
| -dollars | 116.76 | 117.56 | 119.26 | 121.97 | 125.81 | 130.96 | 136.48 | 142.36 | 148.63 | 155.17 | 162.15 |

TABLE C-29

THE STATE OF MARYLAND
STATE POLICE RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 29.11 | 30.57 | 32.09 | 33.70 | 35.38 | 37.15 | 39.01 | 40.96 | 43.01 | 45.16 | 47.42 |
| BENEFITS | 5.29 | 5.84 | 6.43 | 7.09 | 7.82 | 8.62 | 9.51 | 10.48 | 11.56 | 12.74 | 14.05 |
| ASSETS | 107.15 | 121.01 | 135.87 | 151.78 | 168.78 | 186.90 | 206.19 | 226.68 | 248.40 | 271.36 | 295.59 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 387.68 | 380.98 | 374.15 | 367.17 | 360.04 | 352.77 | 345.34 | 337.75 | 330.01 | 322.10 | 314.03 |
| - in dollars | 112.86 | 116.45 | 120.08 | 123.73 | 127.40 | 131.07 | 134.72 | 138.35 | 141.94 | 145.47 | 148.91 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 39.29 | 39.31 | 39.32 | 39.33 | 39.35 | 39.36 | 39.38 | 39.39 | 39.41 | 39.42 | 39.44 |
| -dollars | 11.44 | 12.01 | 12.62 | 13.25 | 13.92 | 14.62 | 15.36 | 16.14 | 16.95 | 17.80 | 18.70 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase-------- 5.00%

TABLE C-30

THE STATE OF MARYLAND
STATE POLICE RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 29.11 | 30.57 | 32.09 | 33.70 | 35.38 | 37.15 | 39.01 | 40.96 | 43.01 | 45.16 | 47.42 |
| BENEFITS | 5.29 | 5.84 | 6.43 | 7.09 | 7.82 | 8.62 | 9.51 | 10.48 | 11.56 | 12.74 | 14.05 |
| ASSETS | 107.15 | 122.66 | 139.46 | 157.61 | 177.19 | 198.26 | 220.88 | 245.11 | 271.02 | 298.64 | 328.03 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 387.68 | 375.58 | 362.97 | 349.86 | 336.27 | 322.21 | 307.70 | 292.76 | 277.42 | 261.70 | 245.64 |
| - in dollars | 112.86 | 114.80 | 116.50 | 117.90 | 118.99 | 119.71 | 120.04 | 119.92 | 119.32 | 118.19 | 116.48 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 39.29 | 39.10 | 38.89 | 38.66 | 38.40 | 38.12 | 37.81 | 37.47 | 37.11 | 36.72 | 36.29 |
| -dollars | 11.44 | 11.95 | 12.48 | 13.03 | 13.59 | 14.16 | 14.75 | 15.35 | 15.96 | 16.58 | 17.21 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase========== 5.00%

TABLE C-31

THE STATE OF MARYLAND
STATE POLICE RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 29.11 | 30.57 | 32.09 | 33.70 | 35.38 | 37.15 | 39.01 | 40.96 | 43.01 | 45.16 | 47.42 |
| BENEFITS | 5.29 | 5.92 | 6.62 | 7.40 | 8.28 | 9.26 | 10.35 | 11.58 | 12.94 | 14.48 | 16.19 |
| ASSETS | 107.15 | 121.01 | 135.92 | 151.92 | 169.07 | 187.42 | 206.99 | 227.83 | 249.98 | 273.45 | 298.27 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 387.68 | 392.08 | 396.60 | 401.20 | 405.86 | 410.54 | 415.22 | 419.85 | 424.39 | 428.79 | 433.00 |
| - in dollars | 112.86 | 119.85 | 127.29 | 135.20 | 143.61 | 152.53 | 161.98 | 171.98 | 182.53 | 193.64 | 205.32 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 39.29 | 39.72 | 40.18 | 40.66 | 41.17 | 41.71 | 42.28 | 42.89 | 43.53 | 44.20 | 44.91 |
| -dollars | 11.44 | 12.14 | 12.90 | 13.70 | 14.57 | 15.50 | 16.50 | 17.57 | 18.72 | 19.96 | 21.29 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase---------- 6.50%

TABLE C-32

THE STATE OF MARYLAND
STATE POLICE RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 29.11 | 30.57 | 32.09 | 33.70 | 35.38 | 37.15 | 39.01 | 40.96 | 43.01 | 45.16 | 47.42 |
| BENEFITS | 5.29 | 5.92 | 6.62 | 7.40 | 8.28 | 9.26 | 10.35 | 11.58 | 12.94 | 14.48 | 16.19 |
| ASSETS | 107.15 | 122.66 | 139.50 | 157.76 | 177.49 | 198.78 | 221.69 | 246.30 | 272.66 | 300.82 | 330.83 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 387.68 | 386.68 | 385.42 | 383.89 | 382.07 | 379.96 | 377.53 | 374.77 | 371.66 | 368.19 | 364.34 |
| - in dollars | 112.86 | 118.19 | 123.70 | 129.37 | 135.19 | 141.17 | 147.28 | 153.51 | 159.85 | 166.28 | 172.77 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 39.29 | 39.52 | 39.75 | 39.99 | 40.22 | 40.47 | 40.72 | 40.97 | 41.22 | 41.48 | 41.75 |
| -dollars | 11.44 | 12.08 | 12.76 | 13.47 | 14.23 | 15.04 | 15.88 | 16.78 | 17.73 | 18.73 | 19.80 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 6.50%

TABLE C-33

THE STATE OF MARYLAND
JUDGES AND THEIR SURVIVING SPOUSES
RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| | YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFORMATION | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| PAYROLL | 11.18 | 11.74 | 12.33 | 12.94 | 13.59 | 14.27 | 14.98 | 15.73 | 16.52 | 17.34 | 18.21 |
| BENEFITS | 3.37 | 3.72 | 4.10 | 4.52 | 4.98 | 5.49 | 6.05 | 6.68 | 7.36 | 8.11 | 8.95 |
| ASSETS | 4.19 | 7.27 | 10.53 | 13.95 | 17.52 | 21.23 | 25.06 | 28.98 | 32.95 | 36.94 | 40.90 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 495.44 | 486.88 | 478.15 | 469.23 | 460.12 | 450.82 | 441.33 | 431.64 | 421.74 | 411.64 | 401.32 |
| - in dollars | 55.39 | 57.15 | 58.93 | 60.73 | 62.52 | 64.32 | 66.12 | 67.90 | 69.66 | 71.39 | 73.08 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 54.27 | 54.28 | 54.30 | 54.32 | 54.33 | 54.35 | 54.37 | 54.39 | 54.41 | 54.43 | 54.45 |
| -dollars | 6.07 | 6.37 | 6.69 | 7.03 | 7.38 | 7.76 | 8.15 | 8.56 | 8.99 | 9.44 | 9.92 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 7.00%
5. Cost of Living Increase------- 5.00%

TABLE C-34

THE STATE OF MARYLAND
JUDGES AND THEIR SURVIVING SPOUSES
RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 11.18 | 11.74 | 12.33 | 12.94 | 13.59 | 14.27 | 14.98 | 15.73 | 16.52 | 17.34 | 18.21 |
| BENEFITS | 3.37 | 3.72 | 4.10 | 4.52 | 4.98 | 5.49 | 6.05 | 6.68 | 7.36 | 8.11 | 8.95 |
| ASSETS | 4.19 | 7.36 | 10.74 | 14.35 | 18.17 | 22.19 | 26.39 | 30.75 | 35.25 | 39.83 | 44.47 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 495.44 | 486.18 | 476.41 | 466.13 | 455.37 | 444.13 | 432.45 | 420.35 | 407.84 | 394.96 | 381.73 |
| - in dollars | 55.39 | 57.07 | 58.72 | 60.32 | 61.88 | 63.37 | 64.79 | 66.12 | 67.36 | 68.50 | 69.51 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 54.27 | 54.26 | 54.23 | 54.20 | 54.14 | 54.08 | 54.00 | 53.91 | 53.80 | 53.68 | 53.55 |
| -dollars | 6.07 | 6.37 | 6.68 | 7.01 | 7.36 | 7.72 | 8.09 | 8.48 | 8.89 | 9.31 | 9.75 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 5.00%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 5.00%

TABLE C-35

THE STATE OF MARYLAND
JUDGES AND THEIR SURVIVING SPOUSES
RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 11.18 | 11.74 | 12.33 | 12.94 | 13.59 | 14.27 | 14.98 | 15.73 | 16.52 | 17.34 | 18.21 |
| BENEFITS | 3.37 | 3.77 | 4.22 | 4.71 | 5.27 | 5.90 | 6.59 | 7.37 | 8.24 | 9.22 | 10.31 |
| ASSETS | 4.19 | 7.27 | 10.51 | 13.88 | 17.38 | 20.96 | 24.59 | 28.23 | 31.83 | 35.32 | 38.61 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 495.44 | 494.72 | 494.01 | 493.25 | 492.41 | 491.45 | 490.32 | 488.97 | 487.34 | 485.37 | 482.99 |
| - in dollars | 55.39 | 58.07 | 60.89 | 63.83 | 66.91 | 70.12 | 73.46 | 76.92 | 80.49 | 84.18 | 87.95 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 54.27 | 54.58 | 54.91 | 55.25 | 55.62 | 56.01 | 56.41 | 56.83 | 57.27 | 57.73 | 58.21 |
| -dollars | 6.07 | 6.41 | 6.77 | 7.15 | 7.56 | 7.99 | 8.45 | 8.94 | 9.46 | 10.01 | 10.60 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 7.00%
5. Cost Of Living Increase-------- 6.50%

TABLE C-36

THE STATE OF MARYLAND
JUDGES AND THEIR SURVIVING SPOUSES
RETIREMENT SYSTEM
COST PROJECTIONS
(dollars in millions)

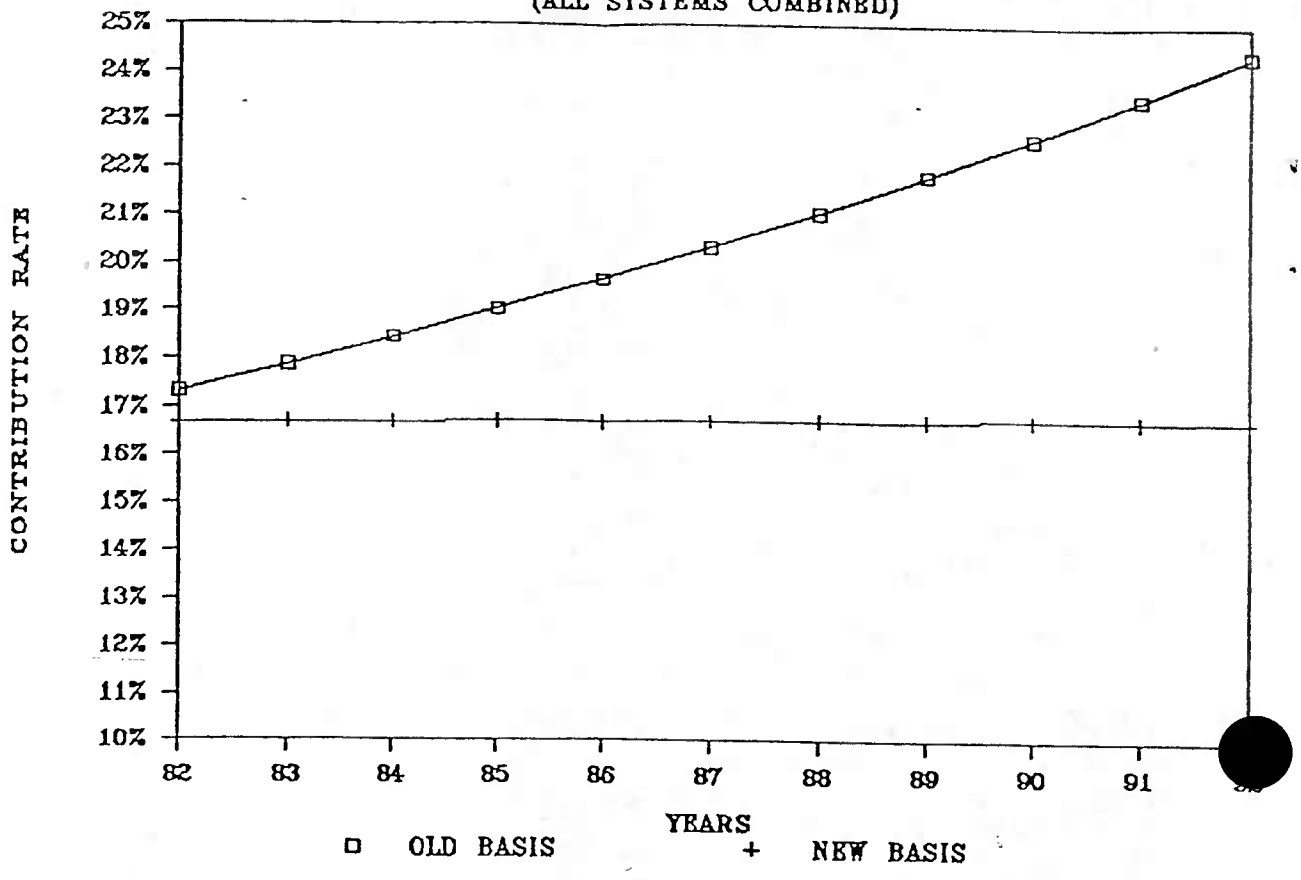
| INFORMATION | YEAR 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAYROLL | 11.18 | 11.74 | 12.33 | 12.94 | 13.59 | 14.27 | 14.98 | 15.73 | 16.52 | 17.34 | 18.21 |
| BENEFITS | 3.37 | 3.77 | 4.22 | 4.71 | 5.27 | 5.90 | 6.59 | 7.37 | 8.24 | 9.22 | 10.31 |
| ASSETS | 4.19 | 7.36 | 10.72 | 14.28 | 18.02 | 21.91 | 25.91 | 29.99 | 34.09 | 38.16 | 42.09 |
| UNFUNDED LIAB. | | | | | | | | | | | |
| - % of payroll | 495.44 | 494.02 | 492.27 | 490.16 | 487.67 | 484.80 | 481.52 | 477.81 | 473.64 | 469.00 | 463.87 |
| - in dollars | 55.39 | 57.99 | 60.67 | 63.43 | 66.27 | 69.17 | 72.14 | 75.16 | 78.23 | 81.34 | 84.47 |
| CONTRIBUTION | | | | | | | | | | | |
| -rate | 54.27 | 54.55 | 54.84 | 55.13 | 55.43 | 55.74 | 56.04 | 56.36 | 56.68 | 57.00 | 57.33 |
| -dollars | 6.07 | 6.40 | 6.76 | 7.14 | 7.53 | 7.95 | 8.40 | 8.87 | 9.36 | 9.89 | 10.44 |

METHODS & ASSUMPTIONS:

1. Actuarial Procedures---------- New Basis
2. Total Payroll Growth---------- 5.00%
3. General Pay Increase---------- 6.50%
4. Actual Investment Performance---- 8.50%
5. Cost Of Living Increase---------- 6.50%

# MARYLAND STATE RETIREMENT SYSTE

(ALL SYSTEMS COMBINED)



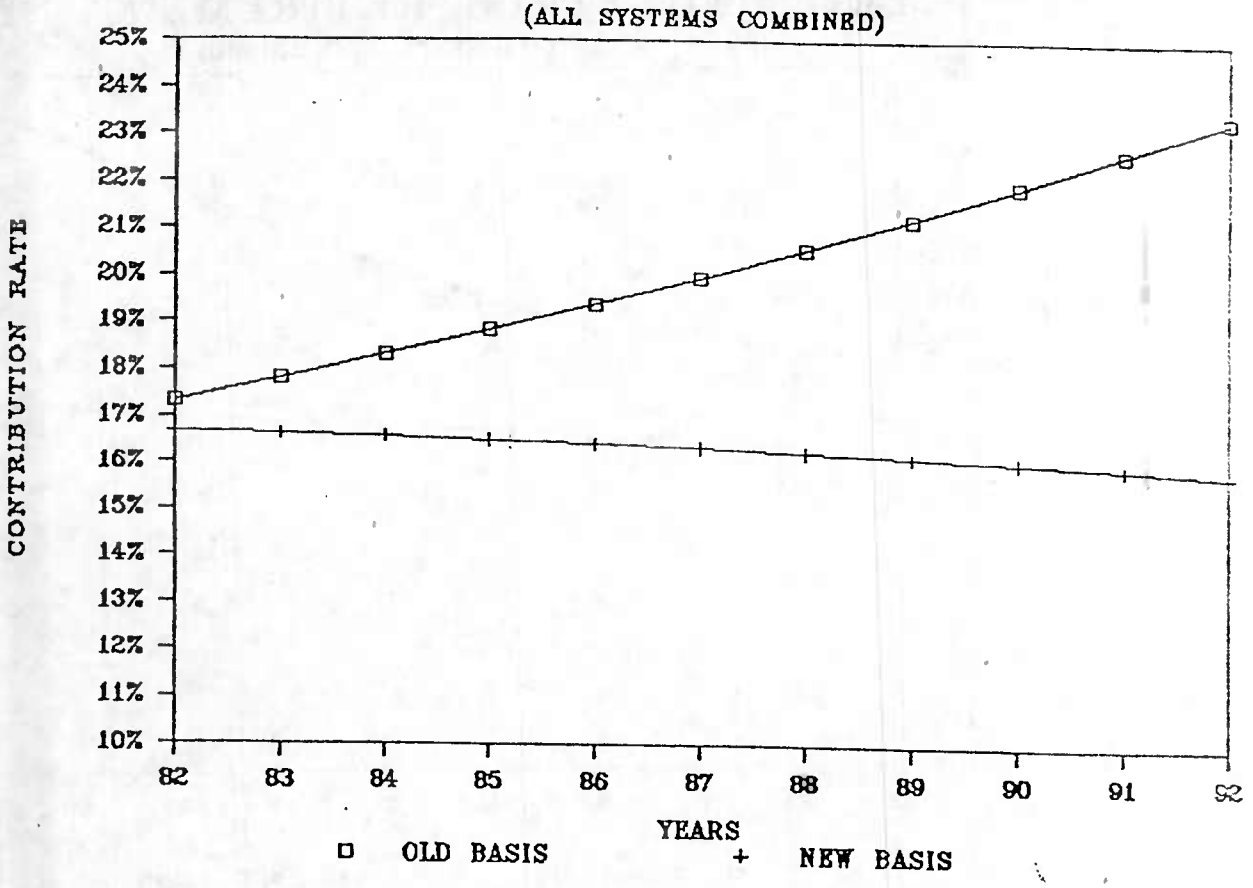

Assumptions

| | |
|---|---|
| Actual Investment Earnings | 7.00% |
| General Pay Increase | as assumed |
| Cost of Living Increase | 5.00% |

All Other Assumptions Are Realized

# MARYLAND STATE RETIREMENT SYSTEMS

(ALL SYSTEMS COMBINED)




Assumptions

Actual Investment Earnings . . . . . 8.50%

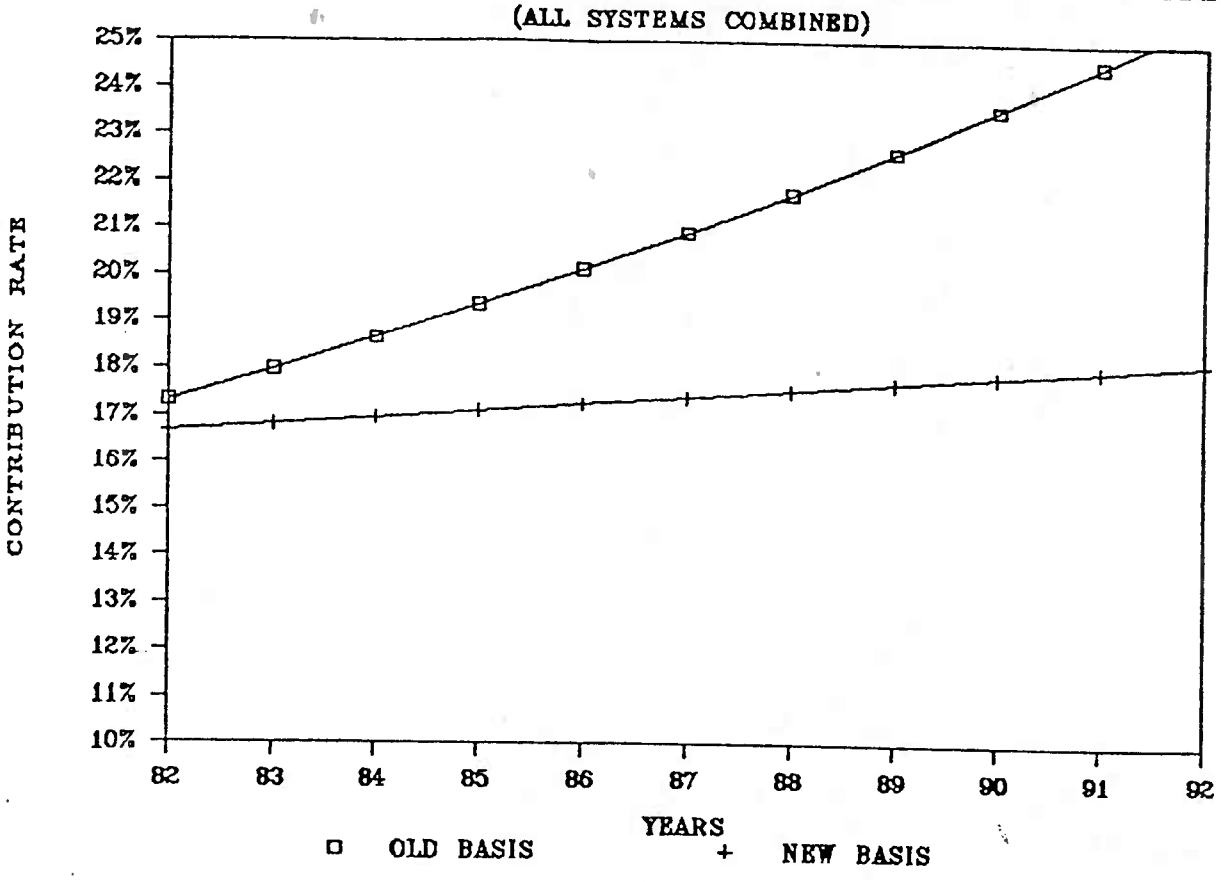
General Pay Increase . . . . . as assumed

Cost of Living Increase. . . . . 5.00%

All Other Assumptions Are Realized

# MARYLAND STATE RETIREMENT SYSTEMS

(ALL SYSTEMS COMBINED)




Assumptions

Actual Investment Earnings . . . . . 7.00%

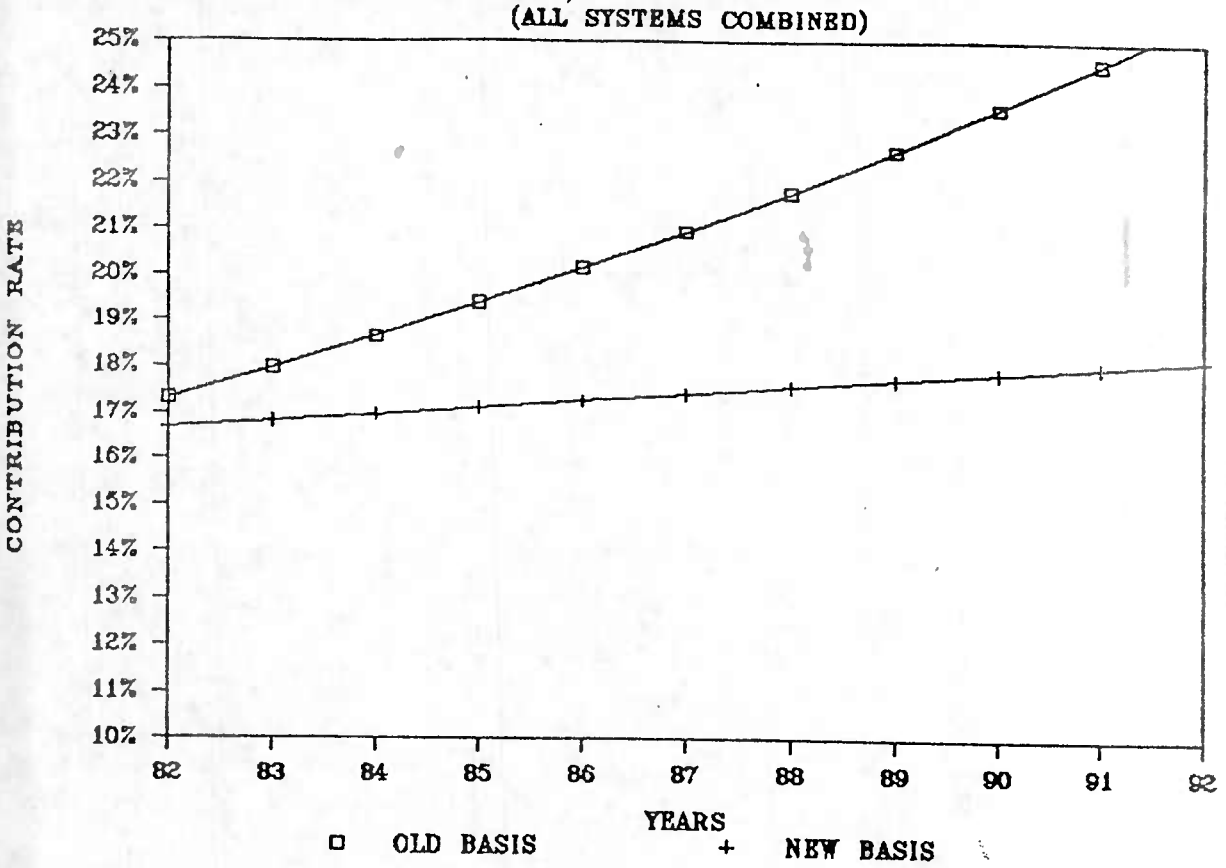
General Pay Increase . . . . . assumed plus 1.5%

Cost of Living Increase. . . . . 6.50%

All Other Assumptions Are Realized

# MARYLAND STATE RETIREMENT SYSTEMS

(ALL SYSTEMS COMBINED)




Assumptions

Actual Investment Earnings . . . . . 8.50%

General Pay Increase . . . . . assumed plus 1.5%

Cost of Living Increase. . . . . 6.50%

All Other Assumptions Are Realized